AUGUST 1952

The Paper Industry

AUG 25 1952
DETROIT

Make a Comparative Test

Many paper mills are now using Type "FSG" ROTARY UNIONS exclusively on their dryer sections because they first tried a few ROTARY UNIONS in comparative tests with other joints. Make a similar test on your own equipment and you too will specify ROTARY UNIONS for every rotary sealing job.

The Type "FSG" was designed especially for continuous heavy duty service on dryers. The unit is flanged directly to the journal and revolves with the drum itself. Its special heavy duty, low friction, metal backed graphite bearing requires no lubrication and withstands high pressures and high temperatures. Two point syphon support gives better alignment and prevents wearing through and falling off, and eliminates breaking of syphon pipe threads.

Take your first step to trouble free rotary steam joint service by making a comparative test. Our own direct representatives will be glad to discuss the application of ROTARY UNIONS to your equipment. Contact our nearest office or write Dept. 8P for our catalog.

TYPE "FSG" ROTARY UNION

Flange syphon type with all-graphite bearing construction.

PERFECTING SERVICE COMPANY

332 Atando Ave. Charlotte, North Carolina

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easy riding

ON SPHERICAL ROLLER BEARINGS

EXCLUSIVE FEATURES OF THE VICTORY BEATER

1. *Controlled Flow — uniform, positive fibrillation*
2. *Pressurized bedplates*
3. *Absolute control up to 40 tons bedplate pressures*
4. *Centralized bedplates assure 100% roll-bedplate contact*
5. *Highest effective inch cut potential*
6. *Horizontal roll oscillation makes bars self-honing*
7. *Lowest maintenance cost*
8. *Tailored-to-your-plant, low-cost installation*
9. *Spherical anti-friction roller bearings*
10. *1000 gallons per minute capacity*
11. *Highest quality, high tonnage production*
12. *All-time record for continuous production!*

VICTORY BEATERS are made in 2 styles: (a) **Single Roll** units for handling batches as small as 500 pounds. (b) **Multi-Roll** units with two, three, or more rolls for treating 100, 150, 200 or more tons per day on a continuous production basis.

It's easy to ride along with the *Controlled Flow* VICTORY BEATER* that holds all-time records for high quality, high tonnage, continuous production.

Let's "take our bearings" among the VICTORY BEATER'S many advantages. VICTORY BEATER rolls are held firm by famous SKF spherical roller bearings with the highest load capacity and radial rigidity. *There is no appreciable bearing wear,* an assurance of perfect roll-bedplate contact at all times. A specially designed rocker mount permits upward or downward loadings and timed roll oscillation for a continuous self-honing effect on the bars.

*Patents issued and pending.

This is just a *single* instance of the VICTORY BEATER'S superiority to any similar refining equipment in the world! For the complete facts and figures, write, wire or phone for Booklet Pi-852.

THE NOBLE & WOOD MACHINE CO.

Paper Mill Machinery

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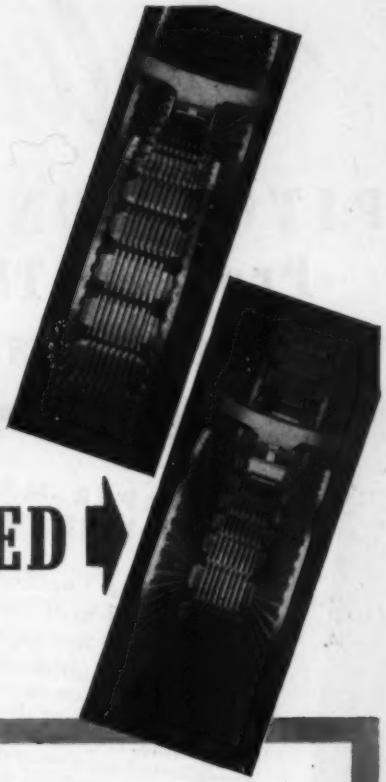
Only the P.I.V. variable speed drive has tooth-grip action... from

MAXIMUM SPEED to MINIMUM SPEED

with an infinite number of positive settings

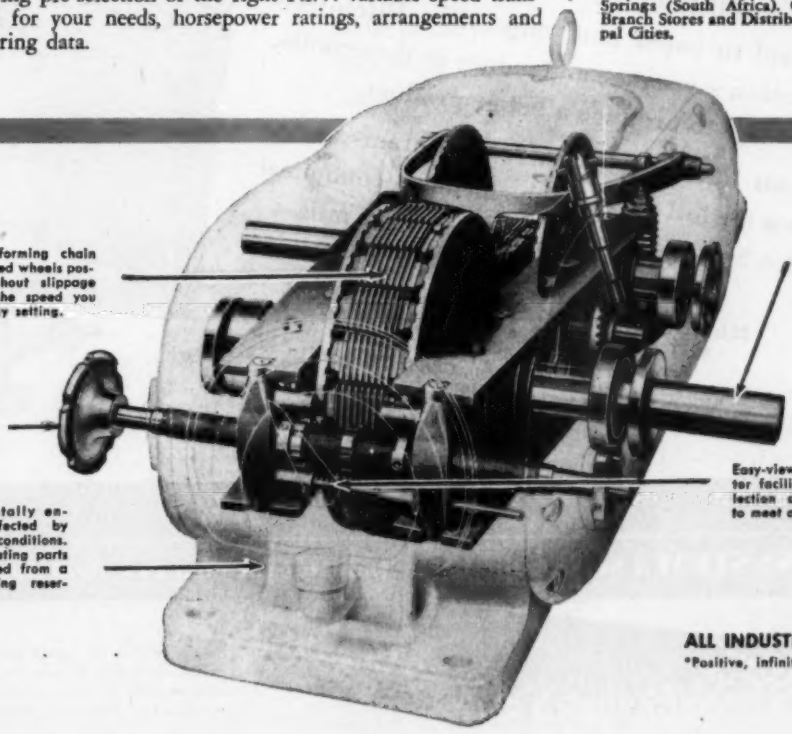


Only Link-Belt's P.I.V. delivers *positive,* stepless speed changing independent of friction . . . because only Link-Belt's P.I.V. has the self-tooth-forming chain that makes this possible. Your nearest Link-Belt branch office can show you how to increase the efficiency and flexibility of your machines, and supply complete information —covering pre-selection of the right P.I.V. variable speed transmission for your needs, horsepower ratings, arrangements and engineering data.

LINK-BELT P.I.V. VARIABLE SPEED DRIVE

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in Principal Cities.

12,298



Self-tooth-forming chain grips toothed wheels positively without slippage — gives the speed you need at any setting.

You can get minute speed changes and maintain them accurately while operating under full load.

An infinite number of positive, stepless speed adjustments may be made with manual, electric, pneumatic or hydraulic controls.

Easy-view speed indicator facilitates speed selection and adjustments to meet all requirements.

All-metal, totally enclosed — unaffected by atmospheric conditions. All vital operating parts splash-lubricated from a common housing reservoir.

ALL INDUSTRY USES P.I.V.*

*Positive, infinitely variable

Nalco

PITCH CONTROL Produces These Typical Results:

✓ "PAPER MACHINES IN FINE CONDITION"

From a Nalco Engineer's report on The Nalco System of Pitch Control in a mill producing fine papers:

"Beater Room Superintendent reported that paper machines were in very fine condition when examined during shutdown period over the weekend. Trays were reported in very good condition and much better than formerly noted. No sticking on press rolls. Oliver filter reported in good condition, no plugging. The Savalla Saveall reported in very good condition."

✓ NALCO ELIMINATED PITCH AND POPLAR WAX

In a mill manufacturing semi-chemical pulp, another Nalco Engineer reports:

"This company ran into considerable trouble recently from pitch and poplar wax in their semi-chemical corrugated medium. These waxes caused filling of wires and sticking of press rolls which in turn caused up to 30 breaks in a day. Nalco Pitch Control was applied at the fan pump and eliminated their trouble."

THE examples above are typical of the success and versatility of The Nalco System of Pitch Control in paper and pulp mills. Pitch-free operation saves time and money in these mills, and helps to produce a better product.

If you have pitch control problems, write Nalco for full data on the efficient, economical Nalco System as it may apply to your mill.

NATIONAL ALUMINATE CORPORATION
6232 W. 66th Place • Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario, Canada

THE
SYSTEM • Serving the Paper Industry through Practical Applied Science

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 34 • NUMBER 5 • AUGUST, 1952

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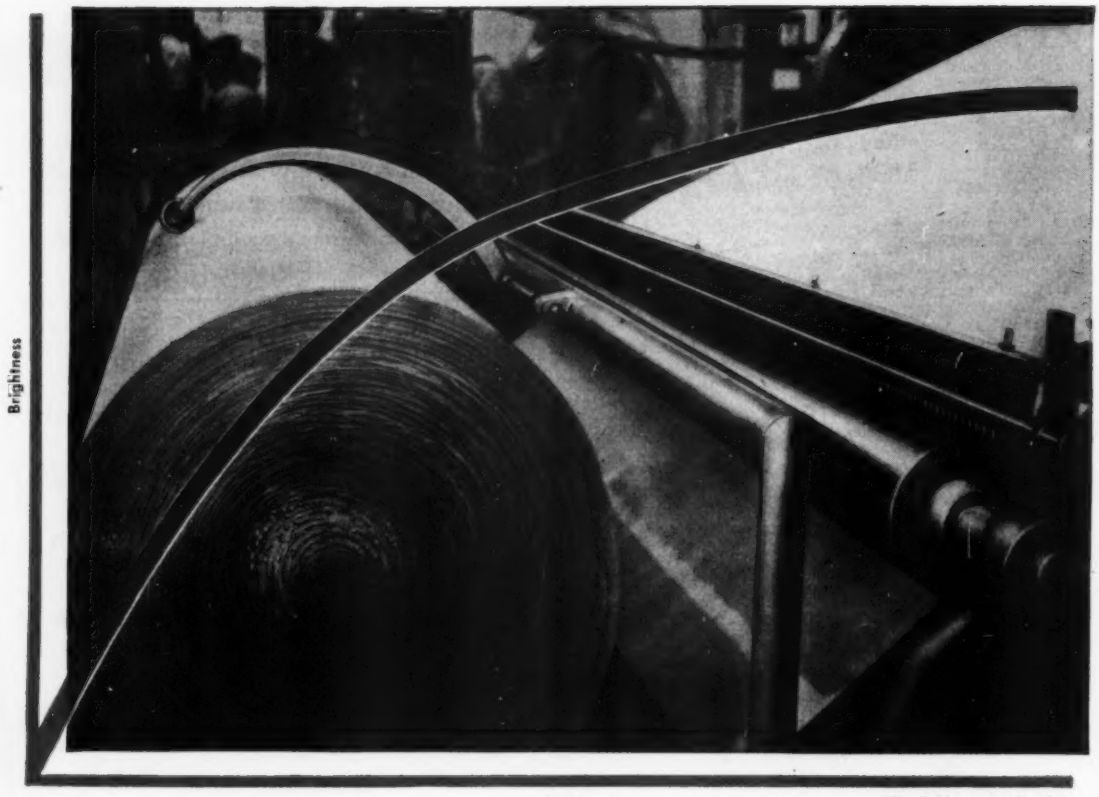
BECCO
PEROXYGEN
CHEMICALS

High Density Bleaching of Chemical and Mechanical Pulps with Hydrogen Peroxide



Bleach Liquor Application on the Kamyr machine

Chemical and mechanical pulp webs and cut chemical pulp sheets can now be bleached at much higher chemical concentrations and at higher chemical efficiency than heretofore. Color stability for reasonable periods of time is excellent.

The new Becco high-density method is suitable for use on any self-sustaining web-producing machine or cut sheets can be bleached by the mill previous to use. Equipment requires a minimum of valuable mill space.

Methods and equipment for semi-automatic or fully automatic high-density pulp sheet bleaching are in an advanced stage.

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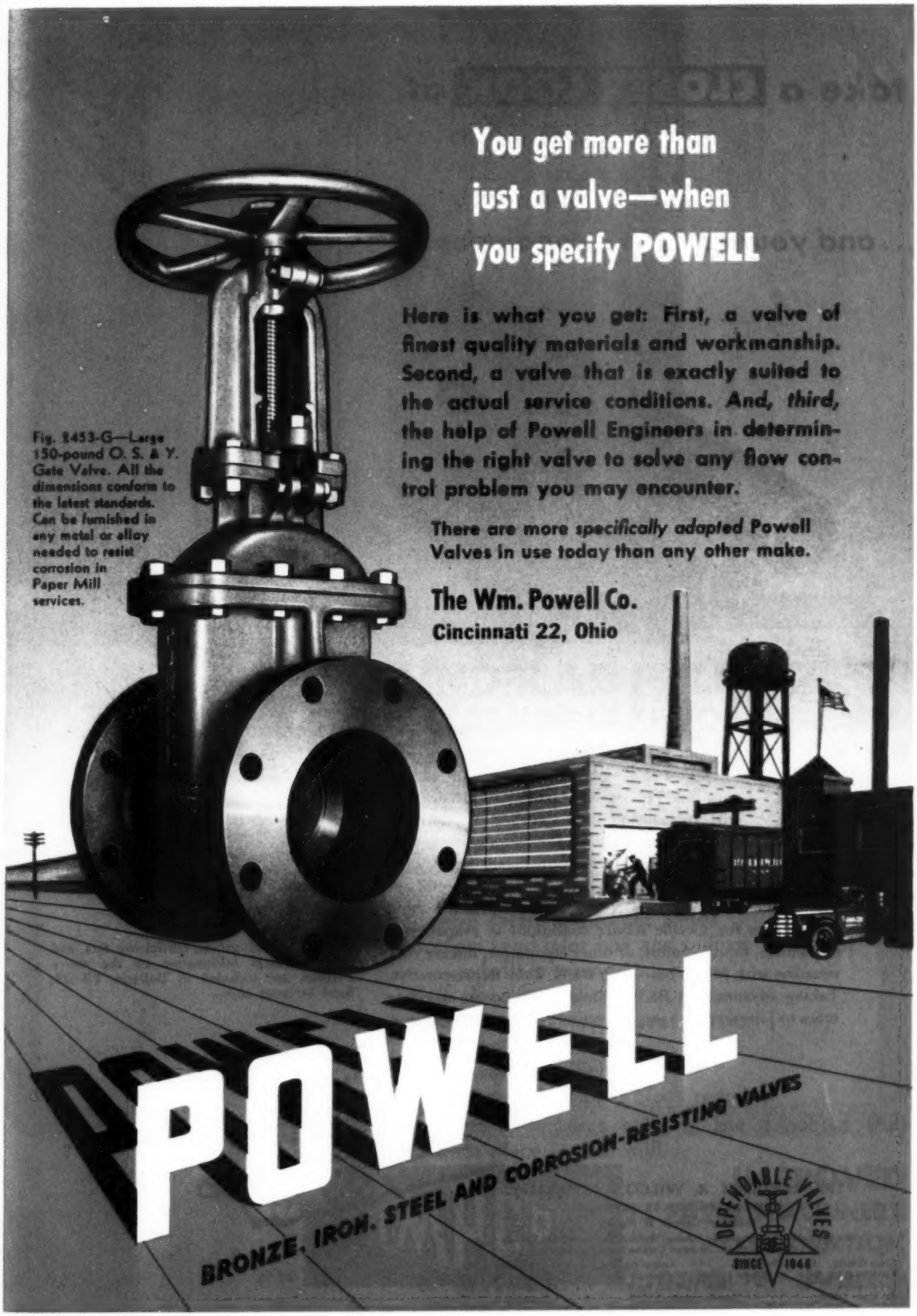
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Here is what you get: First, a valve of finest quality materials and workmanship. Second, a valve that is exactly suited to the actual service conditions. And, third, the help of Powell Engineers in determining the right valve to solve any flow control problem you may encounter.
There are more specifically adapted Powell Valves in use today than any other make.
The Wm. Powell Co.
Cincinnati 22, Ohio
Fig. 2453-G—Large 150-pound O. S. & Y. Gate Valve. All the dimensions conform to the latest standards. Can be furnished in any metal or alloy needed to resist corrosion in Paper Mill services.
POWELL
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DEPENDABLE VALVES
SINCE 1846

take a CLOSER LOOK at B&W TUBING

...and your corrosive conditions

To get optimum service satisfaction and economy with your tubing installations where corrosion resistance is the major requirement, you have to be sure tubing properties are closely matched to the corrosive conditions of each application. B&W carbon, alloy, and stainless tubing grades listed at the right are supplying the wide range of corrosion resistance required in pulp and paper mills.

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Carbon Steel
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Properties, applications, fabricating data, and other technical information on the above analyses are included in Bulletin TB-328. Send for your copy.

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TA-1695S

THE LINDBLAD PULP SCREEN
SAVES VALUABLE FLOOR SPACE IN QUALITY SCREENING OPERATIONS

The Lindblad Screen is designed to enable your mill to have high-quality screened pulp at lower operating cost.

In order to achieve high-quality screening operations, the Lindblad incorporates such characteristics as--

A positive oil-lubricating system
Twelve sectionalized cut plates
Bottom feed inlet box and tailings outlet for sub-floor piping
Self-cleaning ability
Low power and water consumption
High capacity
Space-saving ability
No concrete damping block required

These distinguishing features earn for the Lindblad Pulp Screen a definite place in your mill.

J-19

IMPCO

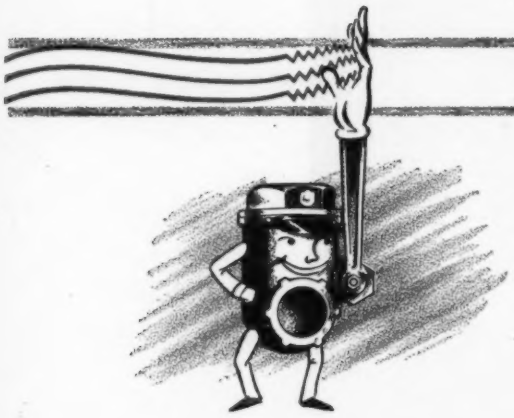
IMPROVED PAPER MACHINERY CORPORATION

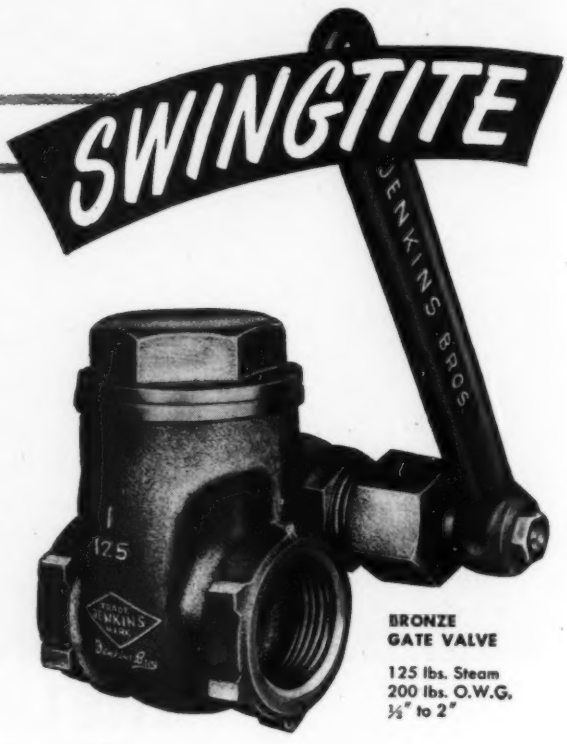
NASHUA, NEW HAMPSHIRE

Sherbrooke Machineries Limited manufacture similar equipment in Canada

Specify this Fast-action Gate for quick, sure STOP and GO services

JENKINS





BRONZE GATE VALVE

125 lbs. Steam
200 lbs. O.W.G.
½" to 2"

Wherever full, free flow is essential . . . where valve opening and closing must be instantaneous . . . Jenkins SWINGTITE Fast-Action Bronze Gate Valves are setting new standards of performance and endurance.

The exclusive rolling disc and guide track design in the new Jenkins SWINGTITE distributes the wear, assuring maximum tightness (since it prevents uneven wear of seating surfaces), and lengthens valve life.

Use the SWINGTITE wherever fast-action valves take a beating on your processing lines. Compare it for long life and low maintenance. Prove for yourself that day after day it opens freely for full flow, and, closed, it seats tight and *stays* tight.

Ask your Jenkins Distributor for the folder, Form No. 196, describing the SWINGTITE in detail. Or write: Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.

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SETTING NEW RECORDS FOR LONG LIFE AND LOW MAINTENANCE IN

- Oil refineries
- Textile finishing plants
- Chemical and food plants
- Pulp and paper mills
- Mines and mineral refining

AND IN SUCH APPARATUS AS

- Laundry machinery
- Dish-washing equipment
- Gasoline and fuel oil lines on motors, burners, etc.
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ONLY THE SWINGTITE HAS IT—

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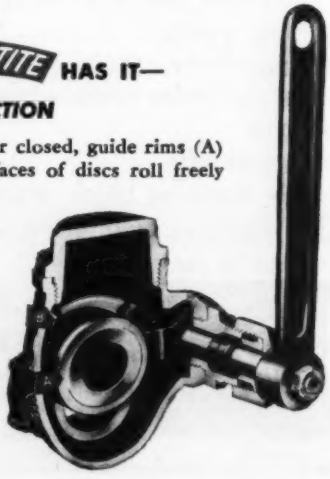
As the valve is opened or closed, guide rims (A) around the seating surfaces of discs roll freely over guide tracks (B) cast in the body, distributing wear evenly, dislodging foreign matter, and providing a polishing action for seating surfaces. This rolling disc and track construction lengthens valve life and assures maximum tightness.



JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 — TRADE JENKINS MARK

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A number of America's leading mills are benefiting daily from the threefold advantages of Sutherland High Yield Systems. Let us tell you what has been done for them, and then show you what a system can do for *your* mill. Write or wire.

SUTHERLAND

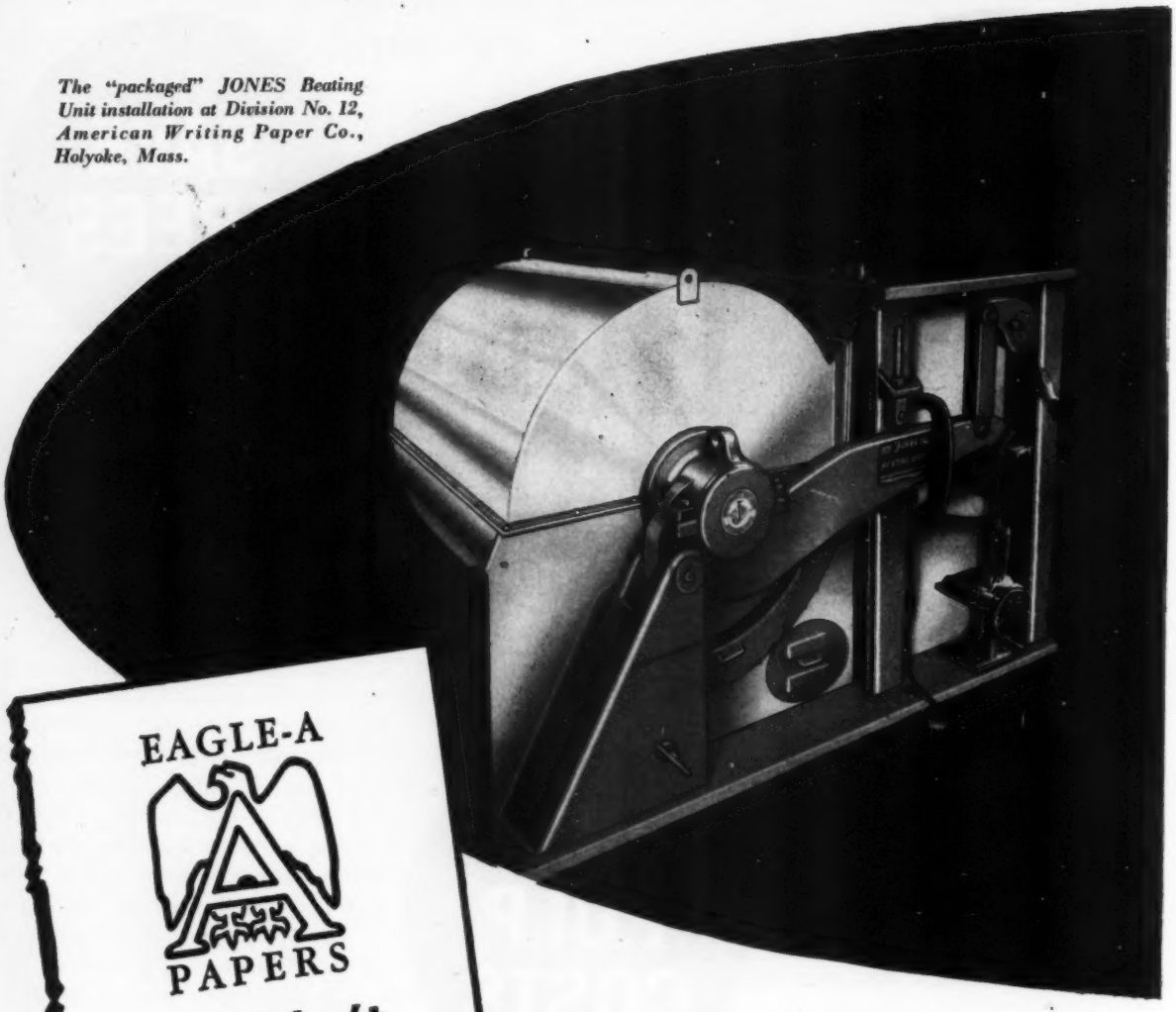
continuous beating systems

Designed, Engineered, Serviced

by SUTHERLAND REFINER CORPORATION

TRENTON 8, N. J.

The "packaged" JONES Beating Unit installation at Division No. 12, American Writing Paper Co., Holyoke, Mass.



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couldn't be better

but the JONES BEATING UNIT helps keep their quality high and cuts power costs 50%!

American Writing Paper reports this Jones Pre-assembled Beating Unit has turned in an amazing performance, maintaining uniform high quality and the physical characteristics of their all-rag stocks . . . with a saving in power consumption of 50% over previous equipment.

Backed by the engineering skill and experience that produced the Jones-Bertrams Patent Beater, this new unit incorporates the best features of that machine . . . but with better control, more positive and uniform treatment of stock, and greater economy of power.

And because it is delivered completely *pre-assembled* it is as simple to install as a Jordan . . . with consequent savings in installation cost, floor space, floor load and maintenance.

Available for tub installation or in a Multi-beater set-up for continuous operation. Ask your Jones representative or write us direct for details.

E. D. Jones

E. D. Jones and Sons Company, Pittsfield, Mass.

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

PARTICIPANTS IN THE PROGRESS OF PAPER-MAKING

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Fourdrinier Wires . . . also essential to paper-making, benefit from 56 years of fabrication experience at Appleton Wire Works, Inc., where continuous research – directed toward making a better product – has *earned* the acknowledgment that *"Appleton Wires are Good Wires!"*

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* Mica Insulation

Coils—the most expensive component to replace, yet the first most likely to require replacement—are entitled to the finest materials and workmanship.

That's why your Elliott 2300-volt Class A insulated machine will have a continuous one-piece wrapper of heat-proof, water-proof, high-dielectric MICA along the entire slot portion of the coils.

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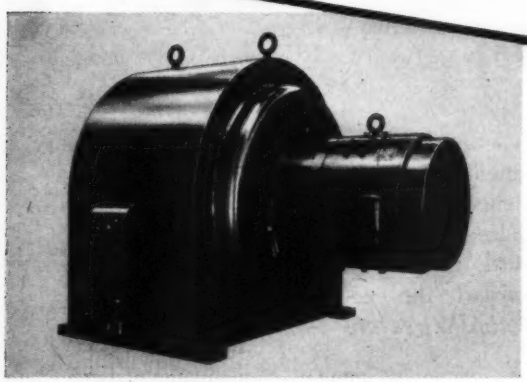
Vacuum-pressure impregnated coils are supplied for outdoor service or where there is excessive moisture.

Coil insulation is twice tested—before installing in the machine and again after testing of the completed machine. Test voltages exceed A.I.E.E. specifications.



An Elliott high-speed synchronous motor with overhung type exciter mounted on bracket bearing.

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FOR MOTORS 1—200 HP:
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R2-19

When Choosing Clutches and Brakes for Your Equipment, Look Over These

CHECK POINTS
OF FAWICK SUPERIORITY

In selecting clutches and brakes for your machinery, Fawick is your logical choice. Check these six points of Fawick superiority.

1 DRUM-TYPE AIR OPERATION

Fawick clutch and brake units provide a 360° friction surface and uniform-pressure, constant-velocity contact between the full width of the friction shoes and the drum. Greatest operating torque results from the application of operating pressure at the maximum diameter.

2 OPTIONAL CONTROL

Local or remote finger-tip control of instantaneous and smooth starting and stopping increases operating efficiency. Clutch or brake action can be sensitively regulated while units are in operation.

3 SELF-ADJUSTING

The rugged Fawick actuating element automatically compensates for wear of friction shoes. This insures complete engagement and dependable service from Fawick clutches and brakes.

4 LOW MAINTENANCE

Even friction-shoe wear reduces lost production time for clutch or brake maintenance. After long periods of satisfactory service, only the friction shoes need be replaced.

5 NO LUBRICATION

Fawick design and construction eliminate the problem of clutch or brake lubrication.

6 SPACE-SAVING

Space requirements for Fawick installations are minimized due to the small number of moving parts and elimination of mechanical linkages. All conventional mounting arrangements are made with a substantial saving of vital axial space.

A Fawick clutch or brake of the correct type and size to meet your machine design and operating requirements is the best solution to your application problem. Check with Fawick before you buy.

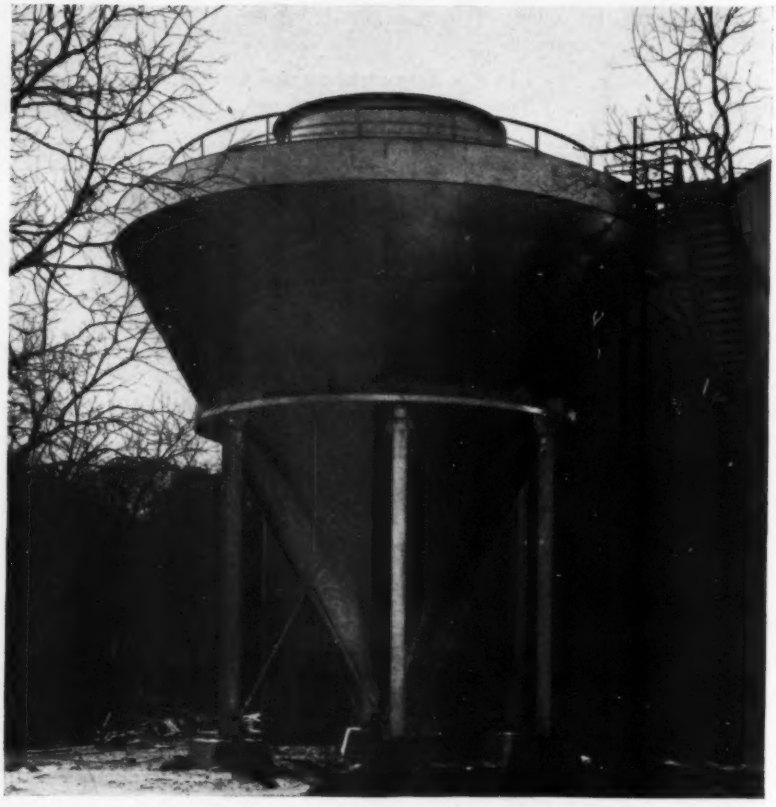
FAWICK Airflex

INDUSTRIAL CLUTCHES AND BRAKES

The FAWICK AIRFLEX COMPANY, Inc.
9919 CLINTON ROAD • CLEVELAND 11, OHIO

CUTTING OPERATING COSTS

WITH A MARX SAVEALL



1,000-gal. per min. Marx Saveall built for Fleming & Sons at Dallas, Texas.

This 1,000-gal. per min. Marx Saveall is recovering 3.3 lbs. of fiber per 1,000 gals. of white water effluent for Fleming & Sons of Dallas, Texas. The recovery of suspended fiber previously lost, reduces operating costs by the actual value of the fiber saved and by permitting re-use of the water.

Approximately 250 tons of paper board is produced every 24 hours at Fleming & Sons. About half of this output, or 125 tons, is made on units served by the Marx Saveall. White water effluent passed through the Saveall has a reduction in suspended matter from 3.5 lbs. per 1,000 gals., to less than .175 lbs. per 1,000 gals. That means the Saveall is operating at approximately 95 per cent efficiency.

A primary advantage of the Marx Saveall is that no chemical coagulents are used. Settlement of fibers takes place as a result of the kinetic energy of the falling liquid from the feed cone on to the deaeration cone. No moving parts are involved, thus there is no danger of mechanical failure occurring. Maintenance costs are also kept to a minimum.

Marx Savealls are typical examples of the special steel plate structures we build for pulp and paper mills. Let our engineers work with you on your next steel plate requirements.

HOW THE SAVEALL WORKS

The Marx Saveall consists primarily of two large steel plate cones, one mounted inside the other. The inner cone is relatively short with a large opening at the bottom.

A small receiving well at the top of the unit, with an inverted deaeration cone directly underneath, receives the waste white water and allows it to overflow on to the deaeration plate (where the air bubbles are shaken loose from the solid particles) and run off its edge. Suspended fibers settle through the inside cone and collect in the bottom of the outside cone. Water, minus most of the solids, rises between the two cones and flows over a circular weir into a draw-off channel. The fibers collecting in the bottom of the unit are drawn off periodically and re-used.

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San Francisco, 4.....1547—200 Bush Street
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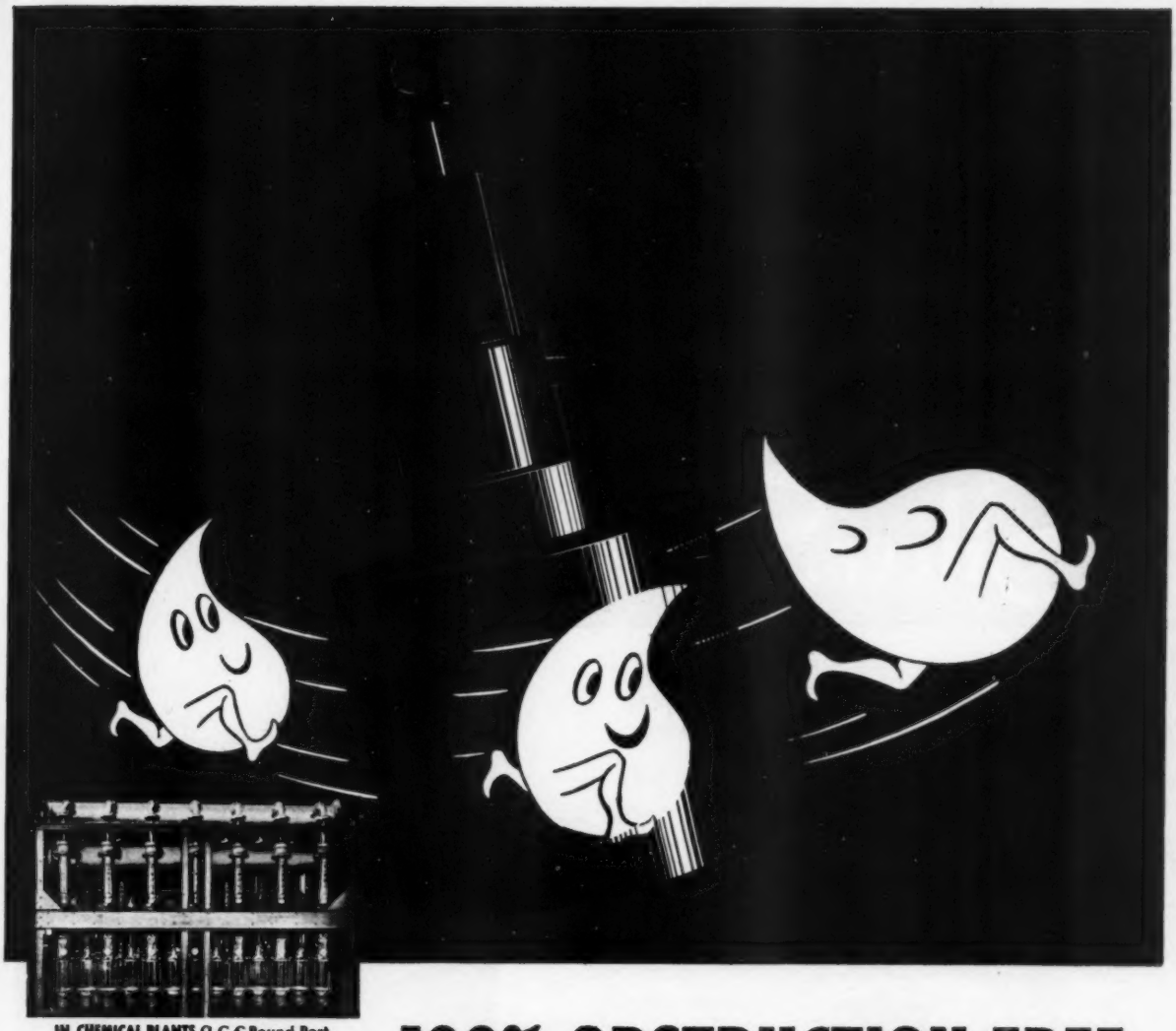
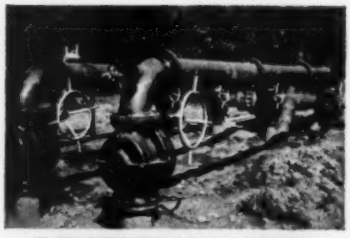
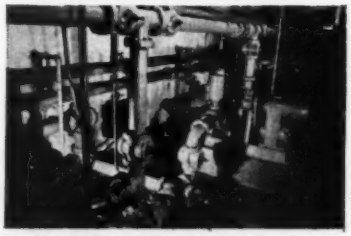


IN CHEMICAL PLANTS a.c.f. Round Port Valves provide quick emptying, full protection against corrosive action.



IN THE PETROLEUM AND GAS INDUSTRY a.c.f. Round Port Plug Valves provide full-area flow with fast shut-off.



IN SEWAGE PLANTS a.c.f. Valves offer uninterrupted flow. CYLINDRICAL plug actually shears obstructions.

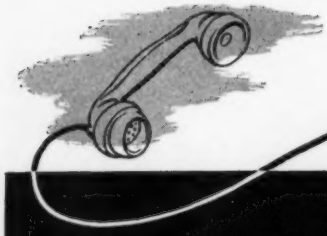
100% OBSTRUCTION FREE

The passage of an a.c.f. Round Port Lubricated Plug Valve exactly conforms to the size and shape of the pipe. Ideal for capacity flow of abrasives and suspensions, these valves have the same quick, quarter-turn shut-off feature of rectangular port a.c.f. CYLINDRICAL "Full Pipe Area" Plug Valves. In addition, an a.c.f. Valve cannot wedge in its seat. Why tolerate a less efficient valve?

a.c.f. CYLINDRICAL FULL PIPE AREA PLUG VALVES

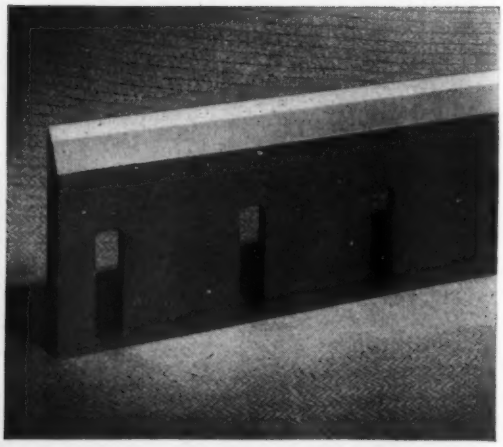
Write for Catalogue 4-PI, American Car and Foundry Co., Valve Division, 1501 E. Ferry Ave., Detroit 11, Mich.

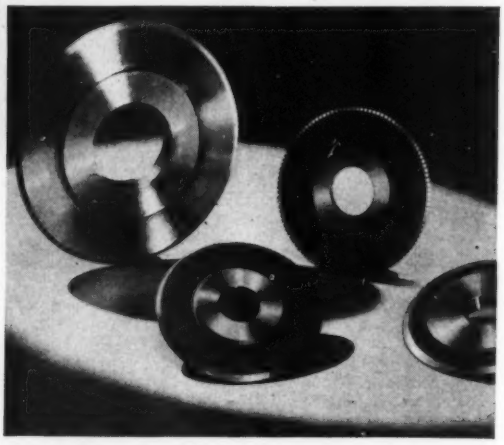
Representatives in 50 Principal Cities

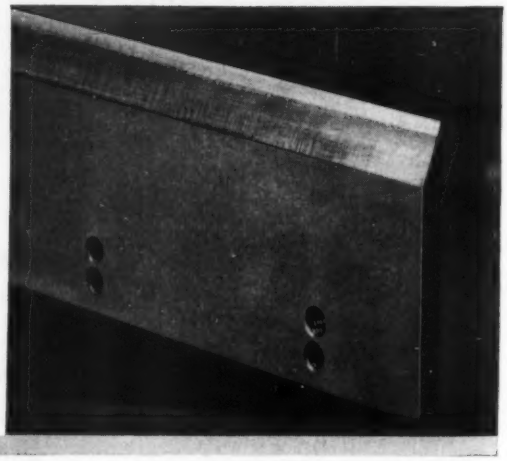


Fast, complete saw service as near as your phone —ask for ATKINS

Silver Steel®







• Ask for Atkins chipper knives, circular slitters, paper knives. Depend on *Silver Steel* for chipping, slitting, trimming—and for cutting costs.

Your nearby Atkins distributor can give you fast, exacting, dependable service—often special emergency service—to keep your production lines up, to keep your labor costs down. He can supply *Silver Steel* equipment to meet your every requirement and specification. He can provide help and advice in making your cutting operations less costly and more efficient. He's backed by Atkins engineering, Atkins research, Atkins craftsmanship—to give you one complete line for every paper-cutting need.

Call your Atkins distributor now. Let him make the *Silver Steel* recommendations that save time and money on every cut. Standardize on Atkins—your one dependable source for all standard paper-cutting tools.

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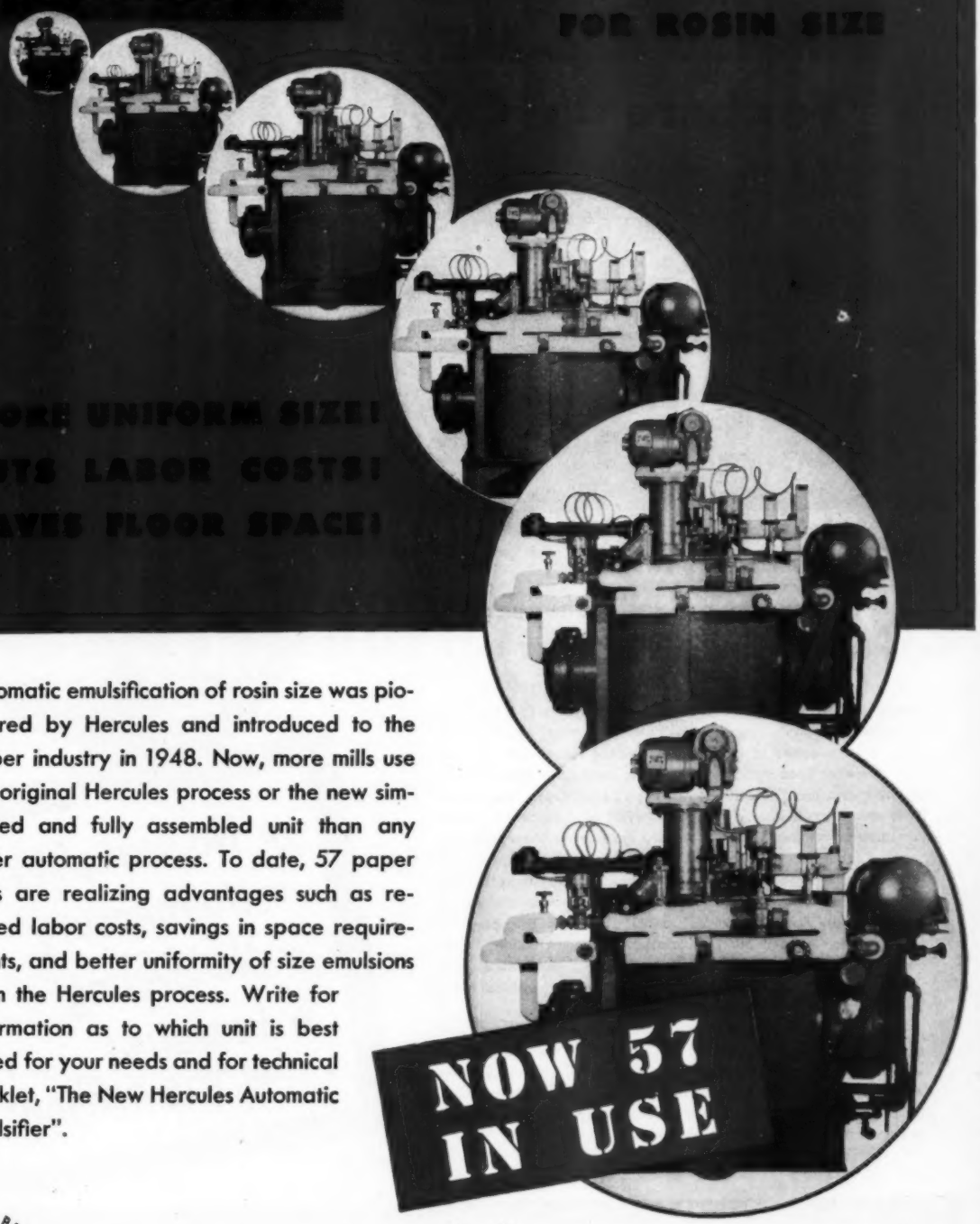
ATKINS

E. C. ATKINS AND COMPANY • INDIANAPOLIS 9, INDIANA

America's Quality Line of Cutting Equipment Since 1857

Chipper knives, circular slitters, paper knives, saws, files—for production, maintenance and other operations—for papers, woods, metals and plastics.

HERCULES AUTOMATIC EMULSIFIERS FOR ROSIN SIZE



MORE UNIFORM SIZE!
CUTS LABOR COSTS!
SAVES FLOOR SPACE!

Automatic emulsification of rosin size was pioneered by Hercules and introduced to the paper industry in 1948. Now, more mills use the original Hercules process or the new simplified and fully assembled unit than any other automatic process. To date, 57 paper mills are realizing advantages such as reduced labor costs, savings in space requirements, and better uniformity of size emulsions from the Hercules process. Write for information as to which unit is best suited for your needs and for technical booklet, "The New Hercules Automatic Emulsifier".

SERVING YOU BETTER • THRU BETTER SERVICE •

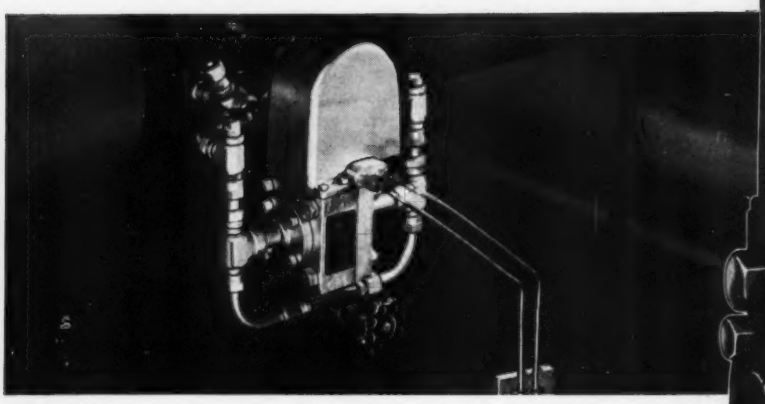
Paper Makers Chemical Dept., HERCULES POWDER COMPANY INCORPORATED *961 King Street, Wilmington 99, Del.*

SIZING MATERIALS AND CHEMICALS FOR PAPER

PPS2-6

Simplest Flow Measurement

with the ALL-METAL Foxboro d/p Cell!



. . . gives fastest response, longest sustained accuracy, lowest installation cost

Simpler in design, simpler and much less expensive to install, far easier to maintain . . . the all-metal Foxboro mercury-less *d/p Cell* offers greater speed of response, permitting closer flow *control*, than has ever been possible before. Its negligible displacement and corrosion-proof construction of Type 316 Stainless Steel eliminate usual maintenance problems, even in service on highly corrosive or viscous fluids previously considered unmeasurable.

The Foxboro d/p Cell measures differential pressure by the force-balance principle and transmits pneumatically to indicating, recording, or controlling receivers. Small, compact, weighs as little as 19 lb. Ranges: from 25" to 800" H_2O. Working pressure ratings up to 4000 psi. Steel or stainless steel construction. Inherent over-range protection. Easy in-the-field calibration and range changes. Optionally available with pre-assembled manifold piping shown in photo above.

Thousands of d/p Cells now in use throughout industry, with many repeat orders now on our books, indicate the wide acceptance and successful performance of this revolutionary development for the measurement of liquid, steam, gas, or air flow. Write for detailed Bulletin 420. **The Foxboro Company, 828 Neponset Avenue, Foxboro, Massachusetts, U. S. A.**

- No seal pots
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RECORDING · CONTROLLING · INDICATING
INSTRUMENTS

FACTORIES IN THE UNITED STATES CANADA, AND ENGLAND

SINCE 1883

TROPICAL

heavy-duty

MAINTENANCE PAINTS

For Special Coatings, Industry has Depended on TROPICAL for 68 Years

Where service is severe, maintenance men have a habit of turning to Tropical heavy-duty paints. In almost any industry you can think of, from steel to textiles, and in commercial buildings and hotels, in schools, colleges, hospitals and institutions, Tropical paints have set records of endurance where the going is tough. Whether the application must resist acid fumes, alkalies, rust or heat . . . on metal, masonry, wood or concrete . . . on floors, walls, ceilings, roofs, machines or equipment . . . there is a Tropical paint *that has proved it can do the job better!* Take advantage of the experience, advice and personal service offered by your local Tropical maintenance paint specialist. Write us today.

Since 1883

HEAVY-DUTY MAINTENANCE PAINTS

TROPICAL®

SUBSIDIARY OF PARKER RUST PROOF COMPANY

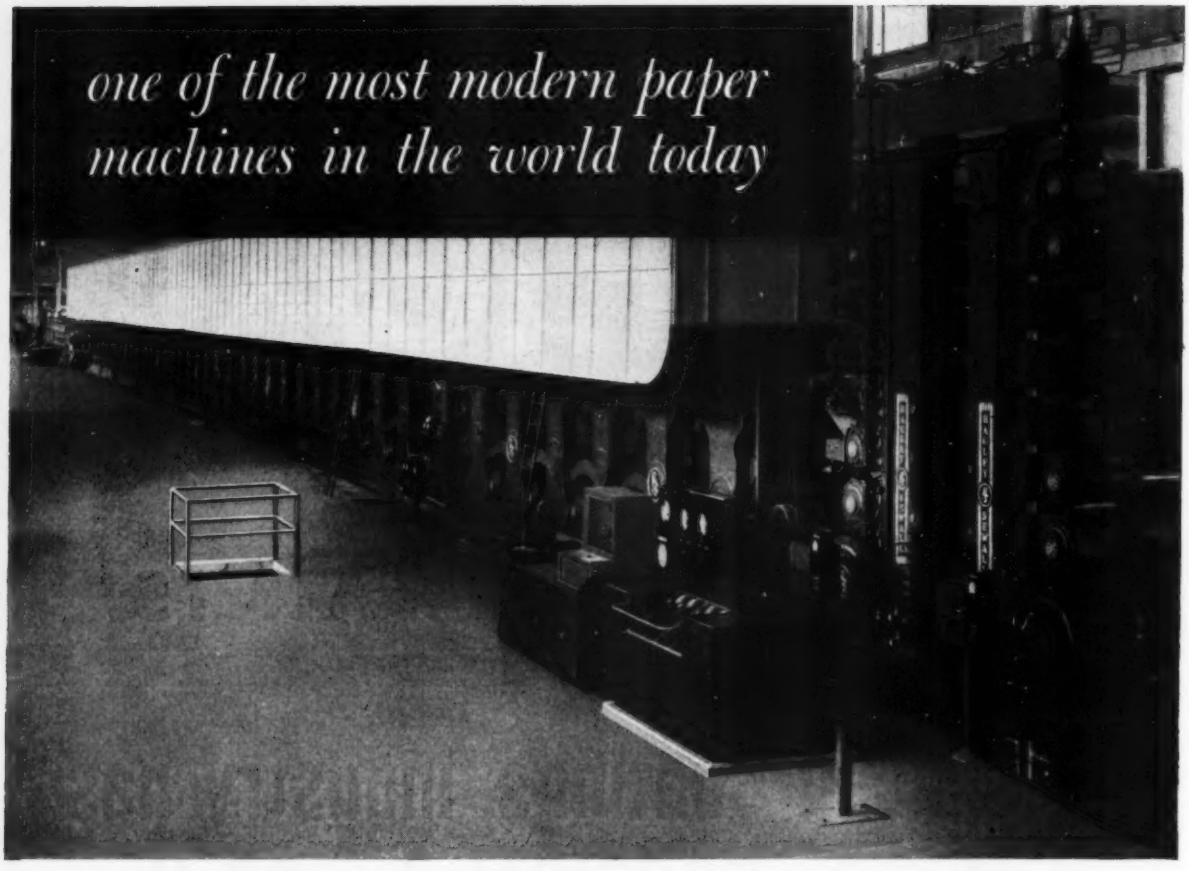
MAKERS OF Bonderite QUALITY CORROSION RESISTANT

Why do Many PAPER MILLS use Tropical?

. . . because the moisture, fumes and acids in paper mills quickly reveal paint qualities and they have proved that Tropical *heavy-duty* paints give performance far superior to ordinary maintenance paints. Extra durability calls for extra quality—*Tropical quality!*

FREE! **Send for your free copy of the "Industrial Paint Index"—a quick, convenient reference chart for a multitude of maintenance paint applications.**

THE TROPICAL PAINT & OIL COMPANY • 1116-1298 West 70th St., Cleveland 2, Ohio



We have designed and built what we believe to be one of the most modern paper machines in the world today. As the modern paper machine has grown in width and speed, it has outgrown mechanical controls . . . but we believe hydraulics is an ideal means of control. This Bagley & Sewall machine is the most completely hydraulic-controlled paper machine in the world. Each major operating unit requiring movement—each pressure operation and control is at finger-tip selection at a station point or console . . . providing instantaneous and accurate operation of the entire machine for the utmost control and productivity.

Recently installed at the St. Regis Paper Company, Cantonment, Florida, this machine has a wire width of 228" and was designed for a production of 400 tons per day at a speed of 2200 feet per minute.

designers and builders of paper making machinery since 1853

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14 of the 15 *Modern*

CHEMICAL RECOVERY BOILER INSTALLATIONS purchased in 1951 are equipped with DIAMOND AUTOMATIC SEQUENTIAL SOOT BLOWER SYSTEMS

Gaylord Container Corporation
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Ketchikan Pulp & Paper Company
Ketchikan, Alaska

Longview Fibre Company
Longview, Washington

H. R. MacMillan Export Co., Ltd.
Nanaimo, Vancouver, B. C.

A/B Oulu, O/Y
Finland

St. Helens Pulp & Paper Co.
St. Helens, Oregon

St. Joe Paper Co.
Port St. Joe, Florida

Southern Kraft Division
International Paper Corporation
Natchez, Mississippi

Thilmany Pulp & Paper Company
Kaukauna, Wisconsin

Union Bag & Paper Company
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United Paper Mills, Ltd.
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DIAMOND POWER SPECIALTY CORP.
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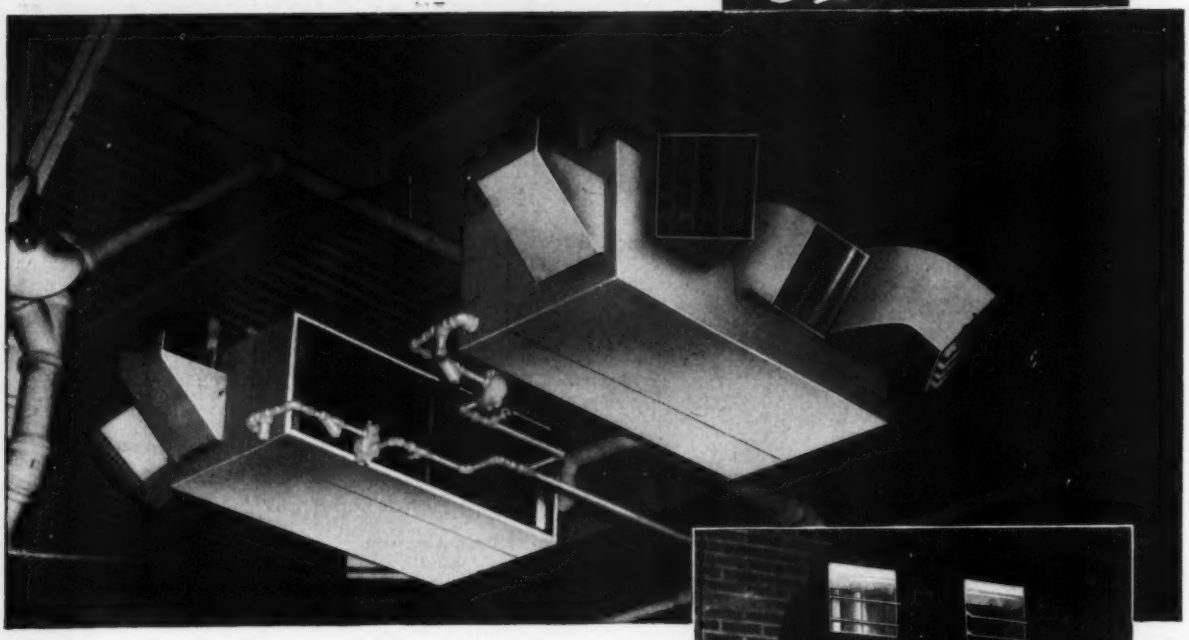
There is a DIAMOND SOOT BLOWER for Every Boiler Cleaning Requirement

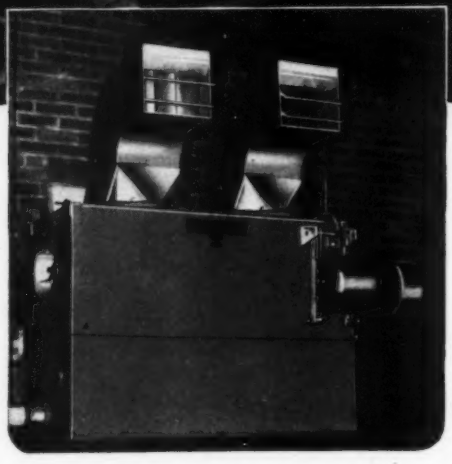
WILL YOU BE READY TO

"TURN on the HEAT"

FOR NEXT WINTER'S PRODUCTION?

IT'S HIGH TIME TO INVESTIGATE "Buffalo" UNIT HEATERS





Now's the time to make sure that warehouse, that shop, that mill or that production line is going to be WARM next Winter, and not a constant source of absenteeism and loss of profits! And it's relatively inexpensive when you use "Buffalo" Heaters. They're very simple to install. Complete selection of the types and sizes you need—for instance, the efficient "Buffalo" Lowboys shown above. Easily installed overhead, they take up no floor space.

ABUNDANT FRESH, WARM AIR!

At right, a "Buffalo" Highboy Heater with fresh air intake through a side wall is doing a thorough heating and ventilating job. Efficient "Buffalo" mixed-flow fans and Aerofin coils assure economical, positive heat distribution with minimum steam pressure. Why not look into this low-cost "Buffalo" heating NOW? Just write for Bulletin 3704-A.

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

213 MORTIMER ST. BUFFALO, NEW YORK

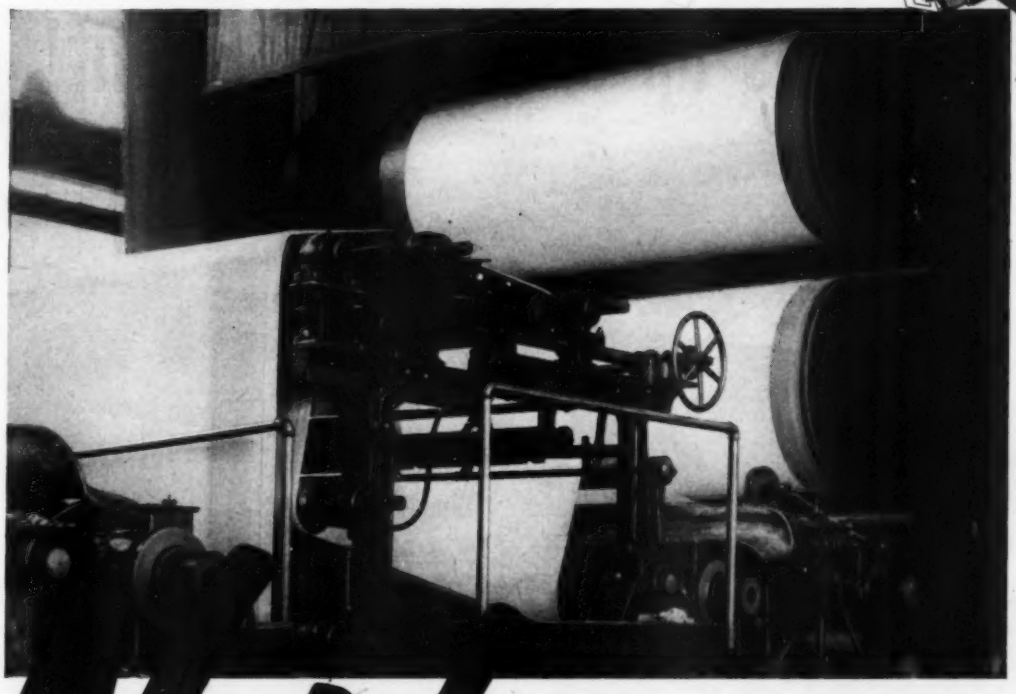
PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

DIAMOND JUBILEE 75TH ANNIVERSARY

VENTILATING | PRESSURE BLOWING | AIR CLEANING | COOLING | AIR TEMPERING | HEATING | INDUCED DRAFT | FORCED DRAFT | EXHAUSTING

Scientific construction makes the big difference



New WOODBERRY 33 RAYCORE DRYER FELT GIVES LOW-COST PERFORMANCE

- Face Reinforced With Asbestos
- Construction Engineered To Eliminate Stretch on Machine
- Open Back Gives High Porosity For Faster Drying
- Nylon-Sewed Clipper Seams With Stainless Steel Insert Available If Desired

Mt. Vernon-Woodberry Mills

BRANCH OFFICES: CHICAGO • ATLANTA

TURNER HALSEY COMPANY
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40 WORTH ST NEW YORK

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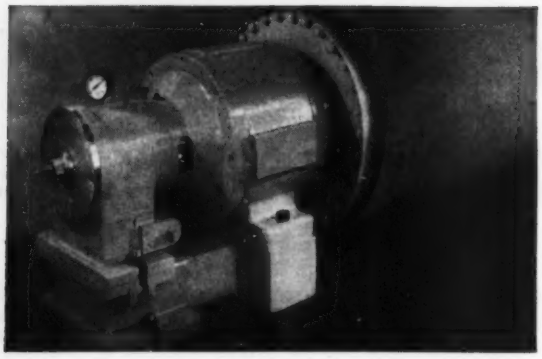
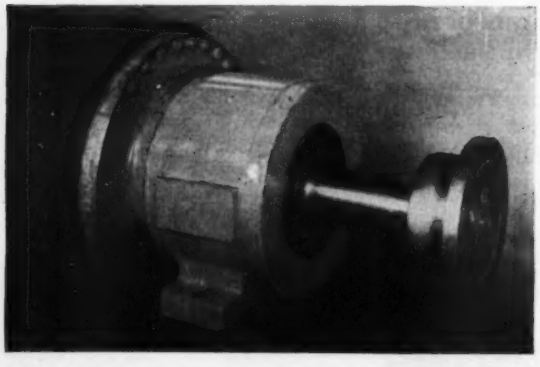
This new, improved Suction Press Roll steps up efficiency... profit!



Note these improvements: Stainless Steel end rings, stainless studs and nuts, generous size anti-friction bearings and housings, and positive locking strips for bonding rubber to centrifugally cast bronze shell.



Rugged steel forgings, fewer working parts and easily replaced packing are only a few of the features of the new Manchester rubber-covered drilled suction press roll.

MANCHESTER has designed this new Suction Press Roll that speeds up production, improves paper quality, gives you greater efficiency on the wet end, and increases your profits.

This rubber-covered drilled Suction Press Roll has every modern engineering advantage you need for top quality and full production. It will reduce your fuel costs in the dryer operation and more than repay the investment.

Write for our new illustrated catalog; and ask us to tell you more about the operating advantages of the Manchester Suction Press Roll.

A Few Other Manchester Products

Drum Winders • Adjustable Shake Motion • Pope Type Reels Paper Machine Drives • Size Presses • Rubber-Covered Drilled Suction Drum Rolls • Drilled Suction Couch Rolls • Cylinder Moulds Complete Fourdrinier • Roll Grinding

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THE MANCHESTER MACHINE COMPANY

1708 CENTRAL AVENUE • MIDDLETOWN, OHIO

SPECIALISTS IN PAPER MILL MACHINERY AND COMPLETE REPAIR SERVICE

Too Big a Bite

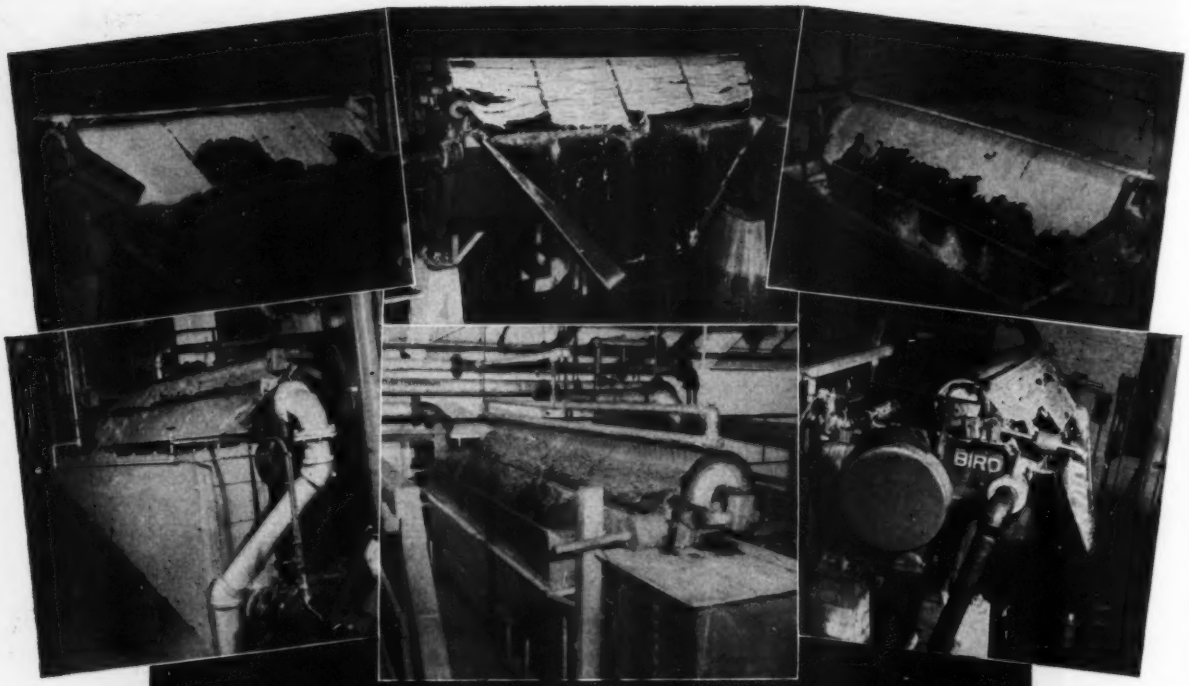
Approximately 11% of the annual forest removal is caused by *drain* . . . the wood destroyed by fire, insects and disease. This is non-recoverable loss and is proving to be largely avoidable under today's modern forest management.

On the brighter side of the picture, is the fact that in the federal government's four forest appraisals made since 1909, the ratio between annual growth and loss by fire, insects and disease has decreased from 28.8% to 11%. Any further lowering of this drain factor will mean that timber growth will more than equal total removal.

Weyerhaeuser foresters, pioneers in tree farming, have established that successful operation of a tree farm depends first upon a fire protection system sufficiently effective to hold annual fire losses below an established maximum. In the case of Weyerhaeuser West Coast tree farms this allowable loss is ¼ of 1% of the acreage . . . as compared to 3.4% nation-wide average.

This is just one facet of the Weyerhaeuser forestry policy which is designed to insure a continuing supply of pulpwood for the Weyerhaeuser sulphite and sulphate pulp mills.

WEYERHAEUSER



GOOD PAPER MAKING STOCK AT LOW COST PER TON

Fibres recovered from paper machine waste water by the BIRD SAVE-ALL represent the biggest bargain you're likely to come across.

The Bird Save-All is designed and built for just that purpose—to rescue the good stock and deliver it to the machine chest all clean and ready to be made into good, salable paper.

The Bird Save-All does the job in the simplest, most direct and economical way. In mill after mill it has paid for itself over and over, and over again.

Have you adequate Save-All capacity for your present volume of production? Remember, the more paper you make, the more stock you recover — when you use

BIRD SAVE-ALLS

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

The Paper Industry

August 1952

Editorial director appointed

Broad experience in chemical technology is at the service of paper makers with the appointment of Dr. A. W. J. Dyck as editorial director of THE PAPER INDUSTRY. He will headquarter in the main offices at Chicago, but will devote much of his time in the field contacting the entire industry.

Since August 1951 Dr. Dyck has been science editor for the Canadian Department of Agriculture, Ottawa, where he was charged with interpreting scientific research, while keeping the various industries abreast of the latest technological developments. Prior to his joining the Canadian government, Dr. Dyck was editor of *Canadian Chemistry and Process Industries* (now known as *Canadian Chemical Processing).*

Dr. Dyck received a Ph.D. in chemistry from McGill University in Montreal in 1935. Prior to World War II he was advisory officer and soils chemist at the Rubber Research Institute of Malaya. From 1941 to 1943 he headed the chemistry division of the Instituto Agronomico do Norte, Belem, Para, Brazil. During 1943 and 1944 he served as senior chemist with the Rubber Development Corp., a U. S. Government agency in Brazil, in which he assisted some Brazilian industries with their compounding problems, and advised government authorities on the uses of rubber in manufactured articles.

Dr. Dyck is a fellow of the Chemical Institute of Canada, a member of the American Chemical Society, the Society of Chemical Industry, the American Association for the Advancement of Science, and the Toronto Writers Club.

No more alibis

The glamour of politics ceased to exist on July 26. When chairman Sam Rayburn officially proclaimed the Democratic National Convention at a close, the glitter and show were things of the past. All that remains is the hard work of the campaigns *and the election.*

This was by no means a strange turn of events. Every four years Mr. and Mrs. United States manages to display a terrific interest in the choosing of the respective candidates. Millions of words tick from the wire services and appear in the daily press. "Who's it going to be?" is the question on every lip. What nation could show more attention to events that could well change the course of history?

Then come the doldrums. From July to November the campaign oratory lulls the voting public. Issues become complex, some hopelessly confused. The ultra-high excitement of pre-convention days is gone. And when election day is past the nation wakes up to the fact that the quadrennial punch line has been a dud.

Perhaps it's the smug certainty that the future is rosy that creates the inevitable lack of voting interest in the United States. Such certainty in Europe was destroyed by World War II. The lesson learned by Europeans is shown in the postwar voting percentages: France (1945), 75 per cent; Italy (1945), 89 per cent; Belgium (1950), 90 per cent; Sweden (1951), 80 per cent, and England (1951), 83 per cent. Three years ago Canada turned out 75 per cent of its voters.

What about the United States? In 1948 only one out of two of our voters continued to show the interest of pre-convention days. In 1880 we had turned out 78.4 per cent. Our smugness grows with the years.

This year we must show the world that we practice democracy as well as preach it. A goal of 63,000,000 votes has been set by the American Heritage Foundation. No alibis will be accepted. And, remember 63,000,000 will still be "way below our 1880 percentage record.

The fallacy of profits

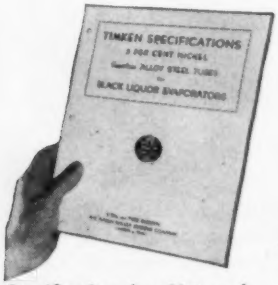
Industrial profits have long withered under the fire of those who would give the impression that those profits are astronomical. That impression has been an easy one to circulate among the general public, since dollars counted in the billions are out of the range of comprehension. However, through the last decade net profits accounted for only about 5 cents out of every sales dollar. In 1951 they slipped to 4 cents. Rising taxes were mostly responsible. Over the years, profits have increased not by reason of higher prices, but because of a tremendous rise in sale volume.

And to those "evil" profits we owe our high American standards of living. They have always been the great source of risk capital, of investment in facilities for larger production. If they had not existed our great production efforts for both war and peace could not be possible.

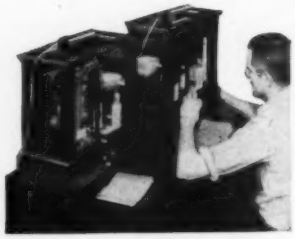
It is these profits that some groups look upon as standing in the way of higher wages. And yet increased wages cannot be paid out of profits. They must be paid out of sales. If all dividends had been withheld last year and used to increase wages, the pay of employees could have been increased by only 5 per cent. And if profits had been paid out to wage earners there would have been no funds for expansion and for increased employment.

No need to guess when you buy evaporator tubes!

The Timken Company shows you what you get

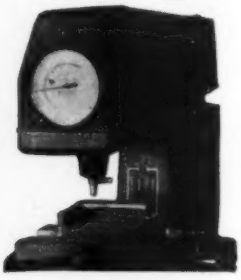


Specifications for 3½% and 5% nickel tubes are available to you with no obligation



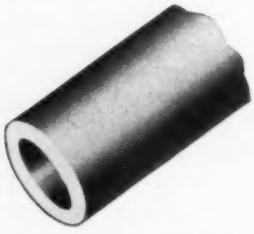
Special chemical composition test of each lot is made at your request.

In flaring test, tube I.D. must expand 20% without cracking or showing flaws.



Tubes must have Rockwell hardness number not exceeding B89.

Each tube tested under hydrostatic pressure of 1,000 p.s.i. before shipment.



Tubes must be free from defects and have workmanlike finish. Inspection is rigid.

Tolerances in O.D., wall thickness, cut length are held to a minimum.

Purchaser has free entry to plant for inspection of work on contract.

...and guarantees you'll get it!

NOW you can buy 3½% and 5% nickel black liquor evaporator tubes and know exactly what you're getting. Specifications published by the Timken Company cover essential points such as physical properties, chemical composition and tests to which the tubes are subjected (see above). And the Timken Company *guarantees* that every lot of 3½% and 5% nickel evaporator tubes will meet these specifications. Quality is rigidly controlled at every manufacturing step and exhaustive tests are conducted before shipment. As a result, you can be *sure* of maximum tube life per dollar.

Many companies using Timken® steel evaporator tubes report lower tube replacement costs, less tube sheet wear and reduced downtime. Write for your copy of 3½% and 5% nickel tube specifications today. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

The Paper Industry Current Comment

Economics . . . bagasse . . . politics

With the presidential election campaign opening in full blast about the first of September and the hurly-burly developments in the Republican and Democratic national conventions, anything is likely to happen in the economic field, while the paper industry pursues its normal course of providing the most essential commodity in the business world.

Faced with such problems as the prolonged steel strike, conflicts over labor legislation, and the like, business men are watching to see what rabbit may be pulled out of the hat to impress the public with the need for continuing the Democrats in power. The propaganda possibilities of the party in power cannot be over-judged.

Bagasse again

Meanwhile, the newsprint situation and the plaints of the publishers continue to share the field with scientific and economic discussions of the possibilities of bagasse as a papermaking material.

The National Production Authority called a conference of newsprint manufacturers to explore the possibility of increasing newsprint production. The NPA officials were told frankly that high investment and production costs are the principal barriers to enlargement of that segment of the United States industry. Meanwhile Ellis Arnall, Office of Price Stabilization administrator, talking to the National Conference of Business Paper Editors, said that 90 per cent of the United States newsprint producers could raise their price $10 per ton without piercing the OPS ceiling, while three can not receive any increase. One remaining mill could increase its price $7 without violating present OPS provisions. Inasmuch as so many mills are now selling newsprint below legal ceilings, much of the ammunition for Representative Celler's campaign against the newsprint industry appears to be of the dud variety. The NPA officials were told frankly that it is more profitable to make grades other than newsprint.

Studies of bagasse as a raw material for the production of newsprint give two views of its possibilities. A committee has been named by Louisiana sugar producers to investigate the possibility of the use of this material, and the conference at which this action was taken was shown copies of a newspaper made from sugar cane waste. On the other hand, *Editor & Publisher* in a survey of the problem was told that one difficulty is the availability of sufficient bagasse to justify the investment in a mill for its use. An official of W. R. Grace & Co., which is making paper and board from bagasse in Latin American republics, said that there is doubt as to the existence of sufficient bagasse in Florida and Louisiana to justify a 100-ton daily capacity mill. It requires 2.2 tons of bagasse, according to this authority, to produce a ton of newsprint and a 100-ton mill would require 60,000 tons of bagasse a year. Bagasse has extensive use as a fuel in the Florida-Louisiana sugar growing regions, and a price increase might result from an effort to secure the large tonnage required to keep a newsprint mill in operation. The availability of bagasse as a paper making material is beyond question. The problem is the improvement of processes for its conversion to make it a commercially profitable operation. The problem is much like that which preceded the developments which made possible the use of southern pine for newsprint manufacture.

White House repudiated

The end of the present Congress, which has expired unless the President calls the members back for a special session, saw a continuation of the repudiation of Administration programs. The House voted to broaden import curbs and proposed to make it illegal for the Government to limit the domestic production of any material in order to restrict United States consumption to an amount fixed by the International Materials Conference. Objection to the operations of the I.M.C. is based on the hostility of Congress to the policy of allowing a conference dominated by foreign powers to control the normal economic development of the United States. World socialism is what this program has been called, with the United States as the target of any type of economic pressure.

In the closing days of Congress, the President was given a new rebuff in the passage of the measure to reorganize the Wage Stabilization Board. As a result of the old board's recommendations for the settlement of the steel wage controversy, the new board is prohibited from issuing any order except with refence to individual cases pending before the board prior to June 27. The new board replaces the old on July 30 and has no power to make recommendations in labor disputes. As a protection against a packed board, the members must be approved by the Senate.

Controls battled

The paper industry has gone officially on record for the removal of all domestic and export controls on pulp, paper and paperboard. This recommendation was made to the NPA by the Pulp, Paper and Paperboard Industry Advisory Committee. It was reported that sulphur, chlorine and alum are in good supply, and that the pulp supply is adequate to meet all needs of the industry. The NPA agreed to take the recommendation under advisement.

In the economic field, conditions are

Correction

In the July issue of THE PAPER INDUSTRY it was stated on page 441 that the bagasse newsprint used in recent press runs on the *New York Times* and the *Journal of Commerce of New York* was "shipped to this country." This statement was in error. The newsprint under question was made at the Herty Foundation Laboratory in Savannah, Ga., having been pulped at a pilot plant in the Midwest.

definitely on the up grade. Demand has begun to increase, and the price situation in various fields is favorable to the placing of orders by consumers and distributors. A critical survey of the situation is provided by J. D. Zellerbach, president of Crown Zellerbach Corp., in his annual report. Inflation and shrinking of dollar values are liquidating capital assets used in the company's operations, he said. Depreciation and depletion charges are based on the actual cost of such assets which were acquired long ago at prices far below present replacement costs. "We are harvesting most of our timber forests purchased a long time ago at a low dollar cost," he said. As a result, he added, earnings in recent years indicate a percentage return overstated in terms of present day replacement values. Also, he felt that the return of more intensive competition makes it unlikely that high operating ratios of recent months can continue.

Financial reports

Surveys of general business indicate that corporate profits the second half of the year are likely to increase over those of the first six months. Inventory losses of the first six months have been absorbed. According to the Department of Commerce, aggregate profits of all corporations declined 16 per cent between the first and second half of 1951, and during the first half of this year profits held at about the level of the last six months of 1951. Stabilization of tax rates, a moderate rise in sales volume and an improvement in the margin of profit are factors which may be expected to improve the profit showing of industry. And in the paper industry the usual trend is for paper prosperity to follow, with some moderate lag, the trend of other industry.

Although paper mill securities followed the general trend of the stock markets, which reached record high average points during the past month, these prices did not in all cases break the previous high points reached earlier in the year. The market, however, has been relatively stagnant while waiting for the results of the political conventions and the outcome of the steel strike which has been a bearish influence on production of many lines of goods.

Net incomes

Brown Co.—Net income for 28 weeks ended June 15 was $3,107,414, as compared with $4,001,122 in the comparable period a year ago.

Champion Paper & Fibre Co.—Net

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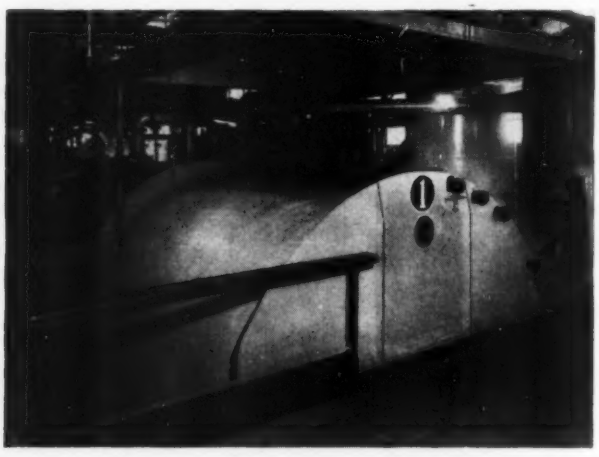

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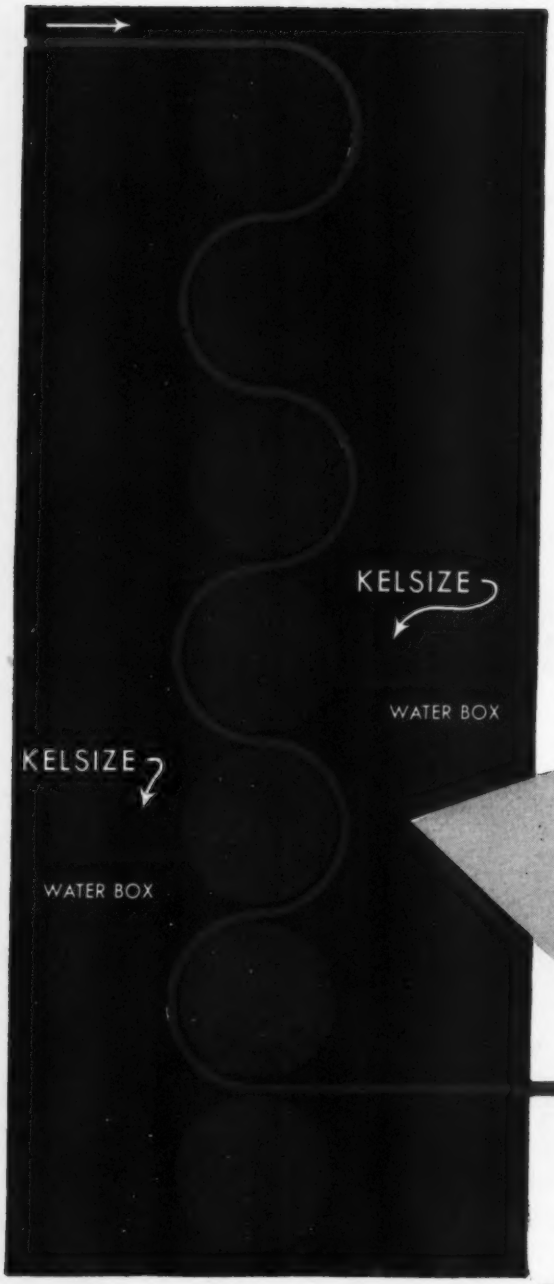

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income for the year ended March 31 was $9,936,191, as compared with $10,590,800 in the previous fiscal year.

Chesapeake Corp.—Net income for 24 weeks ended June 14 was $1,164,274, as compared with $1,578,178 in the comparable period a year ago.

Combined Locks Paper Co.—Net profit for the year ended February 29 was $576,242, compared with $599,469 in the previous fiscal year.

Fibreboard Products, Inc.—Net income for the fiscal year ended April amounted to $5,093,613, compared with $7,229,947 earned in the previous year.

Kimberly-Clark Corp.—Net income for the first half of the year was $5,304,000, as compared with $7,526,000 in the same period of 1951.

Mead Corp.—Net income for 12 weeks ended June 15 was $1,127,053, as compared with $1,495,636 in the comparable period a year ago.

National Container Corp.—Net income for the three months ended March 31 was $1,095,549, as compared with $2,928,381 in the first quarter of 1951, and $935,967 in the first quarter of 1950.

Powell River Co.—Net income amounted to $3,650,933 for the six months ended June 30, compared with $4,245,914 in the corresponding period last year.

St. Croix Paper Co.—Net profit for the March quarter was $253,150, as against $241,820 a year earlier.

New York Stock Exchange—Stocks

	Closing Prices July 21, 1952	June 19, 1952
A.P.W. Products	* 4⅝–5⅛	* 4⅞–5⅛
Celotex	17⅝	17⅝
Same Preferred	* 16¾–17	* 16⅛–16⅝
Certain-teed Products	15	15
Champion P. & F. Co.	29⅛	26½
Same Preferred	99	100½
Chesapeake Corp.	30	* 29½–30⅛
Continental Diamond	12⅞	12⅝
Container Corp.	36	34
Same Preferred	101	101
Crown Zellerbach	56½	53¼
Same Preferred	102⅝	103
Dixie Cup	34½	34½
Eastern Corp.	* 19⅝–19⅞	20⅜
Robert Gair	16½	15⅝
Same Preferred	19⅝	19⅝
Gaylord Container	* 31½–32	32⅛
International Paper	49⅛	47
Same Preferred	*102½–103	*102¼–103¼
Kimberly-Clark	45⅝	* 44⅛–45
MacAndrews & Forbes	41⅝	* 41¼–43
Marathon	26¼	24¼
Masonite	27⅛	28
Mead Corp.	23¼	23⅛
Same Preferred	* 88–89	* 89½–91
National Container	11	11⅛
Rayonier, Inc.	31⅛	29⅛
Same Preferred	* 34⅛–34½	34⅜
Scott Paper	56	53
Same $3.40 Preferred	* 91–92½	* 91–93¼
Same $4 Preferred	*103¼–105½	*103⅜–106½
St. Regis	19⅞	20¼
Same Preferred	93	* 94–96
Sutherland Paper	23½	23¼
Same Preferred	*108½–108¾	108¾
Union Bag & Paper	46⅜	43⅝
United Board & Carton	* 13⅞–14	* 14½–14¾
United Wall Paper	3⅝	3⅝
Same Preferred	* 24⅛–25½	* 24⅝–25½
U.S. Gypsum	114	115
Same Preferred	*175½–177	177¼
West Virginia P. & P. Co.	74⅜	74
Same Preferred	*107⅞–109½	108⅛–108½

New York Stock Exchange—Bonds

Celotex 3½%	99⅝	99⅝
Champion P. & F. Co. 3%	100	99⅝
Mead Corp. 3%	100	99½

New York Curb Exchange—Stocks

Am. Writing	10½	.....
Brown Co.	10⅛	11⅜
Brown Co. $5 Preferred	104	105
Same $3 Preferred	50	50
Great Northern Paper	54⅝	54½
Hammermill	18⅛	18
Puget Sound	.....	28

*Closing Bid and Asked Prices

ST. REGIS PAPER'S PIPE LINE NOW DEFIES ROT

• A large diameter water line that must run under the ground, on top of the ground, up hill and down dale . . . that was the project of St. Regis Paper Company for their Bucksport, Maine plant.

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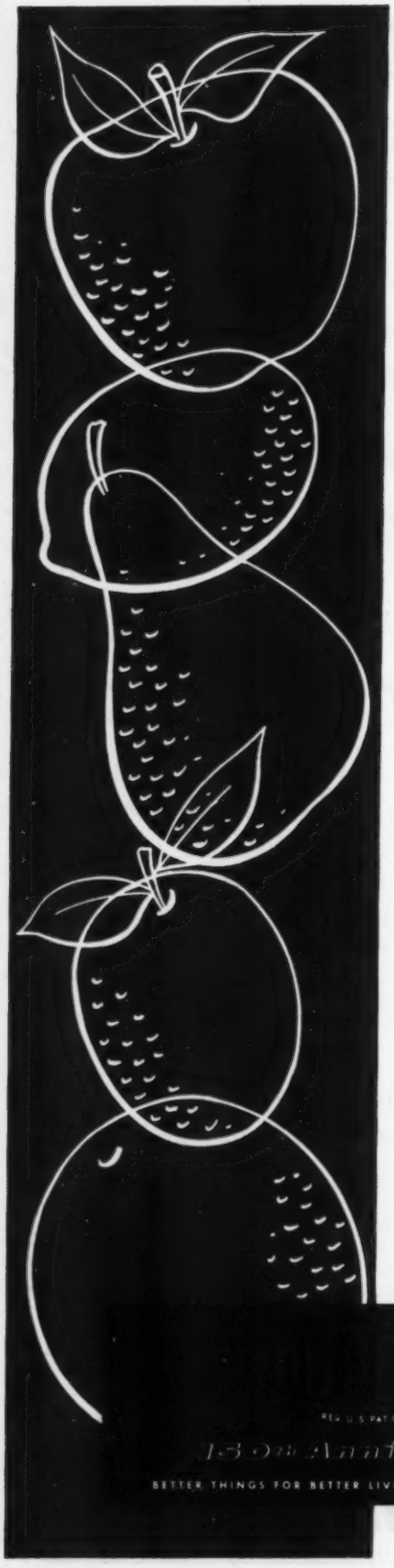

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Economy the Crux of Waste Problem, Power Conference Told

UNLESS THE COST of new equipment needed to evaporate and burn spent sulphite liquor can be written off as a part of necessary power facilities, the paper industry will not "break even" with that form of disposal.

This conclusion was that of R. S. Jolley, steam and combustion engineer for Consolidated Water Power & Paper Co., as he addressed a recent session of the Annual Wisconsin Power Conference at the Schroeder Hotel in Milwaukee. Stressing the need for quick but economic action, he declared that the cost of evaporation equipment and its operation are so large that costs will offset any profit unless there is a high level of efficiency.

Reviewing the work done in Wisconsin and other states to find a workable solution to the paper mill waste problem, Mr. Jolley declared that "adding the cost of new boiler equipment to this investment completely eliminates any possibility of breaking even.

However, if the cost of the boiler expansion is charged as a necessary investment to produce increased steam and/or power for pulp and paper mill processing, there is some reason to believe that it will become economically feasible."

Scientific Research Increased in Wisconsin

In search of facts that will permit treating more sulphite liquor by the yeast process to reduce stream pollution, the pulp and paper industry is increasing its scientific research. Consolidated Water Power & Paper Co. announced in Wisconsin Rapids recently that it has contracted with Iowa State College at Ames to carry on a two-year study of the usefulness of torula yeast as a nutritional supplement in hog feeding.

Funds for the research are being provided by Consolidated. Torula yeast is being supplied by Rhinelander Paper Co., which has the only American yeast-process plant for treating spent sulphite liquor.

The yeast process is recognized as one of the best ways yet discovered by the sulphite pulp industry to cut sulphite stream pollution. The cost is so expensive, however, that part of the costs must be defrayed by sale of the torula yeast produced; most of the yeast manufactured at Rhinelander has gone into various types of animal and poultry feeds.

If the industry can find broader markets for this yeast, it could support more yeast-process treatment plants. The Iowa State project under Dr. Damon Catron, professor of animal husbandry, will supplement a swine-feeding study already under way at Michigan State College that is being paid for by the Sulphite Pulp Manufacturers' Research League at Appleton.

Under the new research contract, Iowa State College agrees to report its findings annually. These will be available not only to Consolidated, but also to all members of the Research League, which is the organization through which 13 Wisconsin pulp mills carry on cooperative research to reduce sulphite stream pollution. A. J. Wiley, technical director of the League, will act as coordinator of the Iowa study.

Recreational Area Pollution Attacked by Rhinelander

New equipment costing several thousand dollars is being designed and built by engineers of Rhinelander Paper Co., Rhinelander, Wis., in an effort to solve a problem that has up to now defied solution. The problem is to clean up a body of water that in hot weather becomes objectionable, especially when the water level is low.

At Hat Rapids, about 10 miles downstream from Rhinelander, under severe conditions during the summer months, fermentive action occurs at the bottom of the Wisconsin River. Solid material from past years may float to the surface and generate unpleasant odors. To keep this material from entering the downstream recreational area at Lake Alice, the paper company in cooperation with resort owners and summer residents has designed a skimming machine. This consists of a floating box that supports an electric pump. The unit is to be anchored just above the Hat Rapids Dam.

One upper edge of the box, as designed, floats just below the water, so that surface water and floatsam will flow into the box. The pump will then expel this liquid and solid material through a hose leading to a lagoon. If the experiment is successful, a lagoon will be excavated on shore at some distance from the river bank to receive the pump discharge. When lagooning proves warranted, a second lagoon will be created so that one can be dried out and emptied while the other is being filled.

Fox River (Wis.) Mills Report Anti-Pollution Efforts

Pulp and paper mills on the Fox River in Wisconsin have spent in the past three years or agree to spend in the near future between $9,500,000 and $10,000,000 to reduce stream pollution, according to mill representatives who recently reported to the State Commission on Water Pollution meeting at Green Bay. The figures were compiled by the Wisconsin Pulp and Paper Information Service.

Four mills have major pollution-control programs in various stages of completion. Each of these projects is costing in excess of $2,000,000. Eight other mills are spending smaller sums to meet less acute problems. Because most of these installations have not yet been completed, exact cost figures cannot now

NEWS HIGHLIGHTS

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be determined, but the preliminary totals indicate that the expenditures will just exceed $9,800,000.

Consolidated Combats Small Particle Problem

To help clean up the waters of the Fox River, Consolidated Water Power & Paper Co. is installing new mechanical equipment at its Interlake mill in Appleton in an effort to intercept waste materials of smaller size than present equipment catches. Small particles of bark that now go into the river will be caught when the new units are set in place. As much of the waste material as possible will be burned for fuel.

Two traveling screens were delivered last week by the manufacturer, Link-Belt Co. of Chicago, and mechanics are at work preparing the site, including substantial concrete supporting walls. When they go into operation, the screens will supplement the fixed-position screen of coarser mesh that has long been in use. Water that floats pulpwood logs to the sawmill will flow through the traveling screens before returning to the river. Bark and other flotsam thus intercepted will travel on the screens to a trough, where a water shower removes it and send it on its way for disposal. Total cost of the installation will be about $20,000. The installation is scheduled for completion within a few weeks.

Disease Combatted by Sulphite Waste Research

Victims of the desert country's Valley Fever, who have a poor chance of recovery if it reaches the advanced or disseminated stage, have been given some hope for overcoming the ailment. The disease, which occurs in the arid southwestern states, has been intensively studied at the Kern General Hospital in Bakersfield, Cal. Treatment results show some encouragement after a year and a half of experiment.

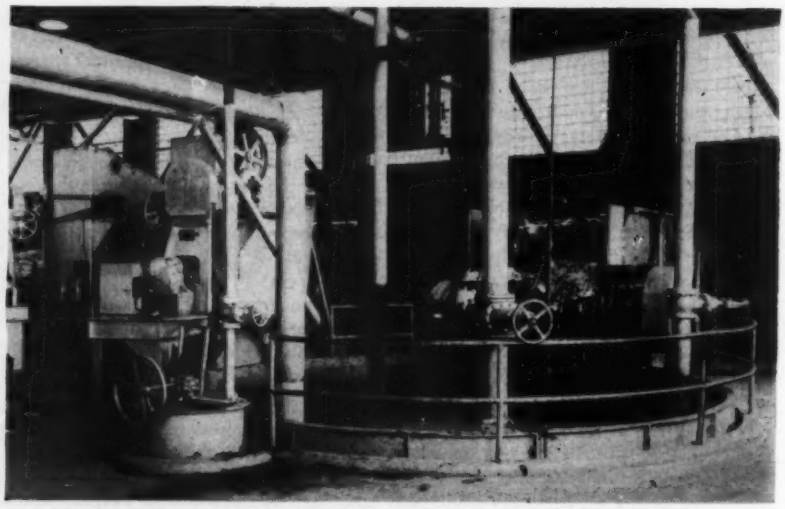
The progress thus far attained was made possible because Wisconsin sulphite pulp mills are working to reduce stream pollution. In their laboratories at the Institute of Paper Chemistry, Appleton, they have produced from spent sulphite liquor a drug known as ethyl vanillate. This is the key drug in the Kern General Hospital treatment and will soon be manufactured by a leading U.S. pharmaceutical house, to be dispensed on doctor's prescriptions.

Valley Fever (Coccidioidomycosis) is caused by airborne spores of a fungus originating in the desert sands. The fungus gets its start in the lungs and the glands about the lungs and from there may spread throughout the system. Children usually suffer from the mild type, which appears like flu or a chest cold, and they generally recover from this without treatment. Thereafter, most of them are immune to further attacks.

The serious type of Valley Fever is the disseminated case, which is seen most often in adults. The infection fails to stop at the lungs but progresses into bones, skin, and brain, causing abscesses, ulcerations, meningitis, and low-grade fever. Men are much more subject to it than women, the dark skinned races more than whites, and farm laborers are especially liable because of constant exposure to the dust. Of the Negroes, Indians, Chinese, Japanese and Filipinos who reach the disseminated stage, approximately 50 per cent die; among whites, the death rate is about 20 per cent.

Dr. Robert Cohen, a child specialist at Kern General Hospital, has been the leader in Valley Fever experiment. According to his findings, of all the drugs tried so far, ethyl vanillate seems the most encouraging. The drug, he reports, has greatly increased the survival rate and has been instrumental in arresting the more advanced cases.

Top-Level Highway Officials from Canada recently spent two days inspecting Wisconsin roads that have been treated with sulphite roadbinder. Canadian sulphite pulp mills produce large quantities of spent liquor, and authorities there look to Wisconsin to find a practical and economical method of its utilization.



HYDRAPULPER INSTALLATION typical of that to be used in stock preparation at the proposed Manchester Board & Carton plant in Richmond, Va.

Manchester Board & Carton Launches $3,000,000 Va. Project

CONSTRUCTION OF ONE of the largest paperboard manufacturing plants in the Southeast has been undertaken at Richmond, Va., by Manchester Board & Carton Co. According to Frank E. Brown, president of Manchester, the $3,000,000 mill is scheduled to be in operation in 15 to 18 months.

The new plant, which will cover 110,000 square feet, will have an initial daily production capacity of 100 tons and will provide employment for about 100 workers. Total production capacity for Manchester upon completion of the mill will be 235 tons a day. The firm operates another Richmond plant and one in Roanoke Rapids, N. C.

The contract for construction has been awarded to Doyle & Russell, while the architectural and engineering work is to be done by Slaughter, Saville & Blackburn of Richmond and by Robertson & Associates, Baltimore. All papermaking machinery and equipment is to be supplied by The Black-Clawson Co.

The machinery covered by the contract with Black-Clawson includes a complete eight-cylinder paperboard machine with all auxiliary equipment and complete stock preparation facilities, which includes four separate Hydrapulper systems to be built by Shartle Bros.

200 Tons Ultimate Capacity

The paperboard machine, designed to produce a daily 100 tons of high-grade folding boxboard, will be ultimately arranged to turn out as much as 200 tons every 24 hours. The unit will produce a continuous sheet approximately 11 feet in width at a rate of up to 500 feet per minute. It is to be 360 feet long and will deliver the finished paperboard

in cut sheets of specified sizes (and also in rolls) ready for conversion.

The stock preparation system to be supplied by Shartle is to comprise a Hydrapulper pulping and cleaning system for the utilization of wastepaper materials to be used as filler or center laminats; while two other Hydrapulpers will provide higher grades of clean virgin stocks for the top and bottom liners of the paperboard.

A deinking system, also utilizing a Hydrapulper, will be employed for reclaiming high-grade liner stocks from printer papers such as ledgers and obnds. It will pulp and cook the paper stock preparatory to washing and bleaching to produce a pure white stock which will be used as liner stock.

According to Mr. Brown, much of the pulp will be supplied by Manchester's wastepaper collecting plant on Mayo Island, Va.

Buckeye Cellulose Grants Foley Equipment Contracts

Contracts for pulp forming equipment for its proposed mill at Foley, Fla., were granted recently by Buckeye Cellulose Corp. Sandy Hill Iron & Brass Works, Hudson Falls, N. Y., will supply the complete bleach plant, consisting of the Sandy Hill Kamry type multistage bleaching and pulp forming and drying machine. Buckeye is a subsidiary of Procter & Gamble.

The pulp forming machine will consist of a 180-inch wire width removable fourdrinier, a special press unit, dryers, reel and sheeter. The machine is to be driven by a Sandy Hill selective drive.

National Gypsum Plans $1,000,000 Research Center

National Gypsum Co. plans to build "in or around Buffalo" a new research center costing more than $1,000,000. According to Melvin H. Baker, chairman of the board, it is hoped that construction will start by early fall, with completion expected by the summer of 1953.

The firm has in the past few years substantially increased its research facilities and personnel for the development of new products, improvement of existing products, and the development of new processes. Under the plan under consideration, all these operations would be centralized.

St. Regis Acquires Vast Florida Acreage

St. Regis Paper Co. has announced the acquisition of management and cutting rights for a 60-year period on a tract of 47,500 acres of long leaf and slash pine in northern Florida. J. W. Gibson Co. of Madison were the agents. Located only a few miles from the company's 217,000-acre Suwannee tract in Georgia, the Gibson acreage is an important addition to St. Regis' raw material resource for its southern operations.

ONE OF FOUR sulphate digesters built at Chicago Bridge & Iron Co.'s Birmingham, Ala., plant for the St. Regis Kraft Corp. mill at Eastport, Fla.; the digesters are 12 feet in diameter and 46 feet in length

The area is served by both the Seaboard and Southern railways and is located approximately 100 miles west of Eastport, where the firm's new kraft pulp and paper mill, with an annual capacity of 100,000 tons, is now under construction. The acreage is also available as a source of supply for the St. Regis "Kraft Center" at Pensacola, where the company operates pulp and paper mills and the largest multiwall bag manufacturing plant in the country. Wood is already being shipped from the Gibson tract for consumption at that center.

At the Gibson tract St. Regis plans to establish its second largest nursery. Here will be raised some 6,000,000 seedlings a year for planting on the company's own lands and for distribution to landowners in the areas in which the company operates. At Pensacola St. Regis operates the largest privately-owned seedling nursery in the South, growing at the present time some 10,000,000 seedlings per year.

Canadian bag production starts

St. Regis Paper Co. (Canada) Ltd. has begun production in its new multiwall bag manufacturing plant at Dryden, Ont. The factory, covering 73,000 square feet, has a capacity more than three times that of the plant that the firm formerly leased from Dryden Paper Co.

St. Regis began its Dryden multiwall bag operation in 1928, with one tubing unit and accessory equipment. In its new plant the company has now installed two tubing units, with full accessory equipment for each, including two web printing press units. Space has also been provided for the installation of a third unit at a later date. Panelyte, a St. Regis product, has been used for certain surfaces in the office, the laboratory, the cafeteria, and first-aid quarters.

Certain-Teed Products Corp.
expected to have its Pryor, Okla., mill in production by the end of July. Jim Hart, resident manager, explained that the opening was delayed by slow delivery of equipment. The plant is to turn out a daily 100 tons of liner paper for use in the firm's gypsum wallboard and will employ about 100 persons.

Potlatch Forests Inc.,
Lewiston, Idaho, has purchased two Pomona, Cal., paper firms. The firms are Fernstrom Paper Mills Inc. and Protecto Products Co., an affiliate. The purchase price was $1,850,000.

Bowaters Southern Paper Corp.
has announced that construction is well underway on its $5,000,000 newsprint mill at Calhoun, Tenn. According to a company spokesman, it will be the largest newsprint mill in the South, with an annual capacity of 50,000 tons. All common stock is owned by Bowaters Paper Corp. Ltd., London, which has large mills in Corner Brook, Newfoundland, and in England.

Judge Rules Pulpwood Seizure Improper

Federal Judge Patrick T. Stone in Wausau, Wis., has ruled that the government acted improperly when it seized a shipment of Minnesota pulpwood consigned to Consolidated Water Power & Paper Co. at Wisconsin Rapids. Contending that the wood was transported with the help of a Canadian tug, a

United States marshal took possession of the 2,100 cords last September 16 at Ashland, Wis. (It is illegal to use a vessel not of United States registry in shipments between states.)

Judge Stone declared that the Canadian tug had helped in rounding up wood at Sugar Loaf, but that the wood was brought to port by a United States boat. He ordered the government to return to Consolidated $35,322 that it had put up to secure its impounded shipment pending a court settlement.

Industry Optimistic; Sees Sales Expansion

A more vigorous operating schedule for paper and board producers in the coming months has been forecast by leading manufacturers. Creating this sales expansion, they believe, are an improvement in consumer soft goods purchases, a pick-up in wood pulp bookings for the third quarter, and a general clean-up of excessive inventory positions both in primary and secondary industries. Few experts, however, believe that the demand will require more than a modest production increase.

Two basic factors are reflected in the increase in wood pulp bookings. They are, according to a survey by the *New York Journal of Commerce*: price declines on some categories of pulp for the third quarter have been satisfactory to pulp consumers, and paper mills are preparing for an increase in paper demand in the fall.

Two Departments Created in N. Y. College of Forestry Reorganization Project

The New York State College of Forestry at Syracuse has been reorganized into three divisions embracing 10 of its 12 academic departments, including two new departments. The new divisions established by the trustees cover physical sciences, biological sciences, and resource management. The new departments are forest chemistry and forest economics, outgrowths of the long-established departments of pulp and paper technology and forest management, respectively.

Reorganization of the college into three divisions embracing 10 departments was recommended by Dr. Hardy L. Shirley, acting dean since January 1, when Dr. Joseph S. Illick retired from the post. Purpose of the groupings, Dr. Shirley explained, is to "distribute administrative duties more equitably and, in doing so, to draw on the mature talents and viewpoints of the experienced faculty members" placed in charge of the divisions.

Two positions of associate dean have been created. Dr. Edwin C. Jahn, director of research, has been designated associate dean for the physical sciences,

Dr. H. L. Shirley

Dr. Edwin C. Jahn

Dr. Wm. A. Duerr

Dr. V. T. Stannett

while continuing to direct research. The associate dean for the biological sciences has not yet been announced.

The resource management division has been made the responsibility of Prof. Herold C. Belyea, head of forest management. A third promotion placed Prof. Svend O. Heiberg in charge of the college's six forest properties and of undergraduate curriculum study and improvement. Mr. Belyea has been on the faculty since 1917 and Mr. Heiberg since 1927.

Dr. Jahn, professor of forest chemistry and faculty member since 1938, has been appointed acting head of forest chemistry. Dr. William A. Duerr, assistant chief of the division of forest economics of the U. S. Forest Service, Washington, D. C., has been named professor and head of the forest economics department, effective August 1. He joined the Service in 1934 and was appointed assistant chief in 1951 after experience at the Southern, Appalachian, and Lake States forest experiment stations.

Dr. Jahn's and Dr. Duerr's staffs are men previously in other departments, plus two new appointees who join the forest chemistry groups. These are Dr. Michael Szwarc of the University of Manchester, England, who was named professor of physical and polymer chemistry, a new title, and Dr. Vivian T. Stannett, a fellow of the Mellen Institute, who was made assistant professor of polymer chemistry. A native of Langley, England, he leaves Koppers Co., Pittsburgh, where he was assistant leader of three polymers and resins groups.

Forest chemistry has been given full departmental status, it was explained, as a result of the College of Forestry's expansion of instruction and research in the chemistry of cellulose and other polymers. The field's importance has grown rapidly with the rise of the plastic industry in recent years and its demand for technically trained men.

Dr. Shirley also said that the foresters' and the general public's developing interest in the economics of forestry called for a department devoted to this field. Aside from undergraduate and graduate instruction in the subject, and various spot studies, the college has made detailed studies of forest land-use in New York State counties during the last five years. These continuing projects and their personnel have been assigned to the new department.

Average Salary of '52 Class $365

An average starting salary of $365 a month for positions in the paper industry was accepted by 14 seniors in pulp and paper technology graduated June 2 at Syracuse. Prof. C. Earl Libby reported the figures and placements shortly before he left to assume new duties at North Carolina State College at Raleigh.

Of the 19 seniors, one will take his degree in September, two have been called into military service, one took a summer job, and a fourth is remaining for graduate work. The salary range for the 14 entering the industry was from $300 to $400 monthly.

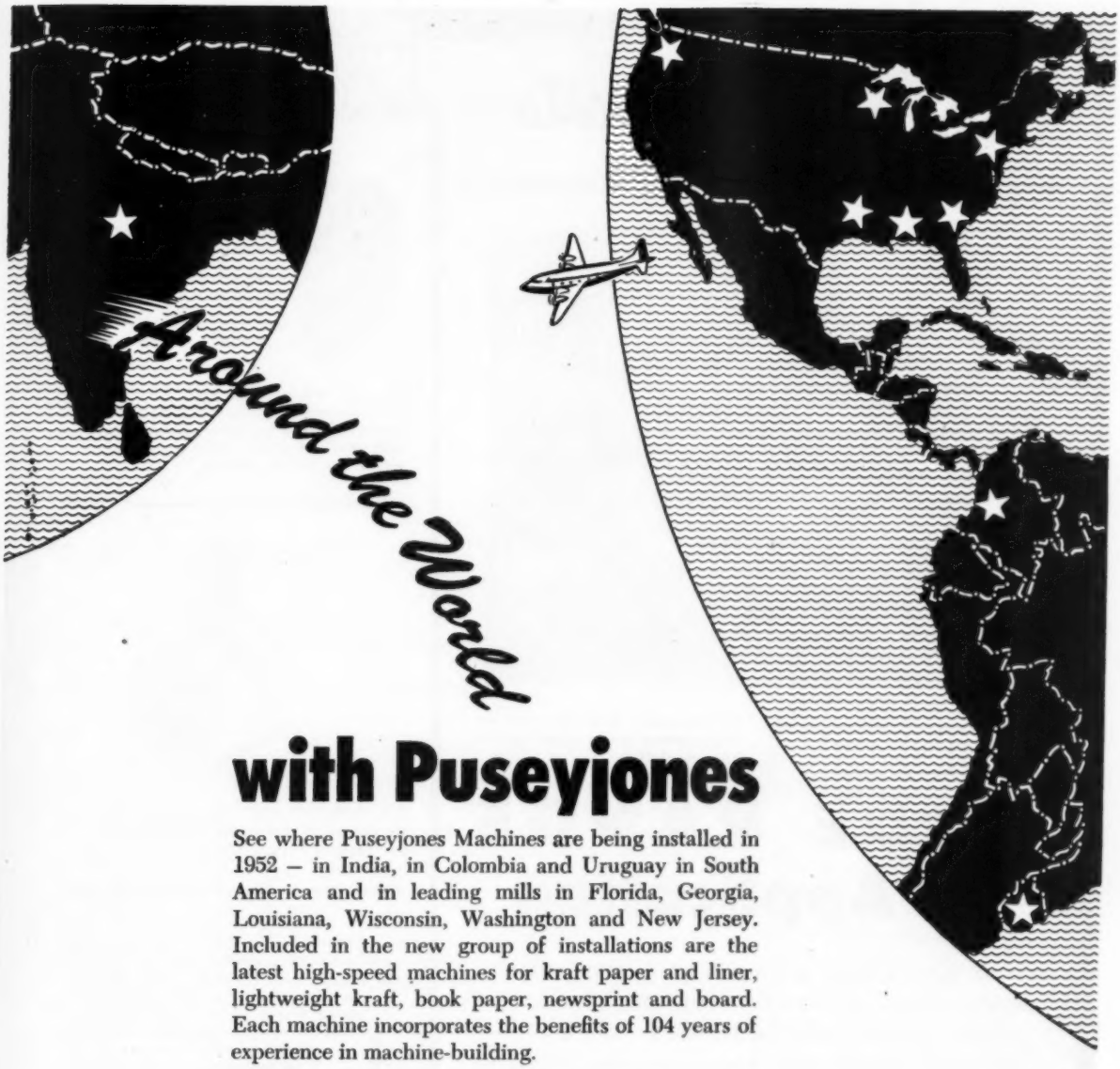
The class brought to 455 the number of men and women graduated by Professor Libby in the 32 years since he helped organize the training in pulp and paper technology. He leaves a department staffed with 30 persons and laboratories and a full-size paper mill with a replacement value of $1,000,000.

Enactment of Fair Trade Laws Means Security, Doeskin President Declares

Enactment of the Fair Trade bill into law signifies a new era of security and guarantees fair profit for manufacturers, wholesalers, and retailers, Emanuel Katz, president of Doeskin Products Inc., said recently. Early in July Mr. Katz pledged a "fight to the finish" against a situation which is "forcing facial tissue merchants to accept a 'starvation margin' of profit in a $115,000,000 industry."

Pointing out that these business men have been faced with a problem of making a fair profit at a time when operating costs are mounting, Mr. Katz, whose firm is one of the big three in the tissue industry, declared that certain competitors had cut the margin of profit to a point where wholesalers and retailers were "making pennies when in all fairness they should have been making dollars.

"In light of this situation," he added, "Doeskin products was the only manufacturer in the facial tissue industry to



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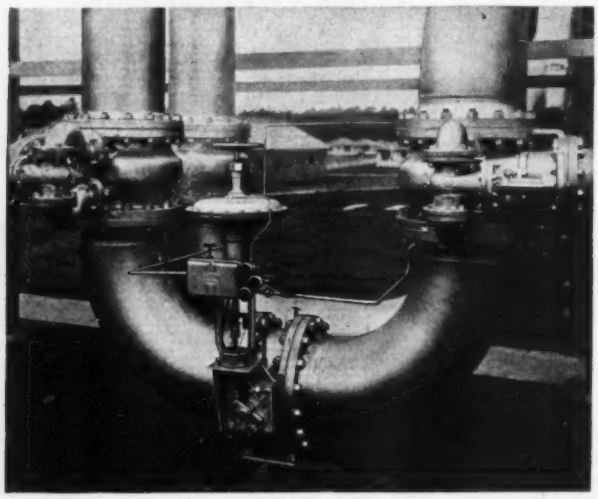

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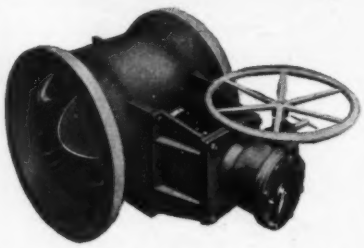
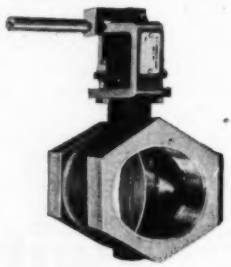
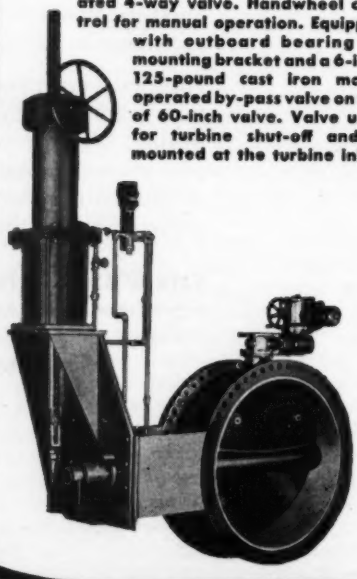


No. 836—24-inch 125-pound cast iron hub-end valve with bronze liner and monel periphery on vane for water service. Equipped with totally enclosed gear reducer, handwheel and locking device.



No. 801—3-inch 125-pound bronze screwed-end valve with handlever control and locking device.

No. 828—60-inch 150-pound cast steel valve with 18-8 shafts, bronze bushings and bronze body liner. Cylinder operator is controlled by electric motor operated 4-way valve. Handwheel control for manual operation. Equipped with outboard bearing on mounting bracket and a 6-inch 125-pound cast iron motor operated by-pass valve on top of 60-inch valve. Valve used for turbine shut-off and is mounted at the turbine inlet.



hold to a policy of guaranteeing retailers a gross margin of profit that not only cleared their expenses but left them a net profit."

". . . In line with the President's recommendation, Doeskin pledges its unfailing cooperation with Congress in any investigation of fair trade practices. Fair trade and fair profit are part of the American way, and those of us who have advocated this have a sincere desire to operate in the interest of healthy business."

Mill Reopenings Cause Little Change in Wastepaper

The flow of waste paper has not materially increased with the recent reopening of paper mills after the annual vacation shutdowns. In Chicago, dealers reported that they still find difficulty in moving mixed paper and old newspapers; however, corrugated cartons were finding ready markets.

It is probable that mills will not take action regarding prices until sometime in August. According to the *New York Times*, it is conceivable that paper and paperboard mills could still get all the raw materials they need even if they offered less than present prices. But as prices are further depressed, dealers are forced to discourage collections and offerings.

A recent report by the Eastern Conservation Committee of the Waste Paper Consuming Industries shows that consumption in the United States during the first five months of the year dropped 23 per cent from the like period in 1951. Paperboard mills, largest consumers of wastepaper, showed the sharpest drop, from 3,207,767 to 2,385,389 tons. However, compared to the last five months of 1951, consumption was only down 4 per cent.

A year ago mixed paper was bringing $20 a ton in Midwest markets. Today, many buyers report that they can get all they want for about $5. Old newspapers that brought $22 a ton a year ago now bring only $12.

Forest Blazes Rage in Many N. American Timber Areas

CLOUDS OF DENSE smoke drifted over two communities near Corner Brook, Nfld., late in July as fire fighters continued their battle to control a racing forest fire that had already burned more than 100 square miles of woodland.

Albert Martin, woods manager for Bowater's Newfoundland Pulp & Paper Mills Ltd., estimated damage at $50,000, not including loss of time in woods operations. He declared that the outbreak will cause postponement for about two years of company plans to take some 10,000 cords of pulpwood out of the area.

Rain was declared to be the only hope of controlling a fire raging 300 miles south of Anchorage, Alaska, July 3. Forestry officials feared widespread damage, with 55,000 acres already destroyed. Virgil Heath, assistant regional forester with the Bureau of Land Management, said military surveyors had dropped smoke bombs from helicopters as temporary markers, and the bombs had touched off the conflagration.

U. S. F. S. Girds for Battle

The United States Forest Service is preparing for its annual summer fight against fires in the Northwest by lining up 252 "flying firemen." About 150 of the smoke jumpers are to work out of Missoula, Mont., while the remainder will be stationed at Intercity Airport, Wash.; Cave Junction, Ore., and McCall and Idaho City, Idaho. Many of the young men, who will utilize aircraft in reaching the scene of the fire, are college students majoring in forestry, while a few are former army paratroopers.

Smoke jumpers are a rugged lot. They have to be rugged to get through the four-week training period required by the U. S. F. S. They undergo long sessions of calisthenics and an obstacle course aimed at limbering and toughening up leg muscles.

Men are not dropped at elevations more than 8,000 feet above sea level; when winds are strong; when the plane is less than 1,000 feet above the ground; in heavy timber, or where cliffs, boulders, or other hazards make a jump too dangerous. The men participating in the work receive a minimum monthly salary of $284, compared with $246 for ground crew members.

Wisconsin Scientists Combat Pulpwood Insect Damage

Entomologists at the University of Wisconsin laboratories in Madison have developed a new means of controlling insects detrimental to the state's paper industry. A spray of benzene hexachloride, according to their report, will control insects in stored pulpwood if the insecticide is applied within 48 hours after the trees are cut. The research work was done by R. D. Shenefelt, E. W. King, and Wakelin McNeel, Jr.

The quality and yield of the pulp is lowered by the insects, because of a fungus which they introduce into the wood. They also increase the fire hazard by leaving piles of sawdust.

The scientists declared in their report that the logs should be sprayed until they drip with the BHC mixture. The cost, according to their estimate, will be approximately $1 per cord, with much less labor required than for peeling. Spraying costs may well drop as researchers develop the process.

USDA Urges Protection

Public and private forest interests in the South are being urged by the U. S. Department of Agriculture to join an all-out campaign to stop needless destruction by insects on their 180,000,000 acres of timber. Currently, the Bureau of Entomology and Plant Quarantine is heading a drive to organize groups of forest-minded individuals into a forest-insect detection and reporting team that will help to reduce damage through periodic inspections. Such a team can in many cases lead to control of insects before they reach outbreak proportions or cause widespread damage.

The Department emphasizes that the voluntary help in reporting unusual forest conditions, such as dead, dying, or defoliated trees, can increase the effectiveness of the campaign. U.S.D.A. officials are contacting federal, state, and private foresters to enlist their cooperation in all forest and timber areas in the southern states.

Northwest Beetle Outbreak

Foresters in western Oregon have termed the Douglas fir bark beetle as Public Enemy No. 1. The insect has in recent weeks attacked at least 3,000,000 acres of privately and publicly owned forests, mostly in virgin wooded areas.

Unlike the spruce budworm, which can be greatly controlled by spraying operations, the Douglas fir bark beetle infestation can be stopped only by the removal of infected trees. A lack of roads into the attacked region has made the work of land owners difficult and many times impossible.

Following aerial and ground survey work that showed the extent of the epidemic, a northwest forest pest action committee headed by W. D. Hagenstein, chief forester of the Industrial Forestry Association, has been carrying the story of the beetle threat to timber owners in such centers as Eugene, Roseburg, and Coos Bay.

Rhinelander and Marathon Sponsor Aspen Study

A project to increase the rate of growth and the length of wood fibre of the aspen has been undertaken by Dr. Phillips N. Joranson of Beloit College's department of biology, Beloit, Wis. The work, watched with keen itnerest by the

state's pulp and paper industry, is supported by Marathon Corp. and Rhinelander Paper Co.

The use of aspen pulpwood has increased enormously during the past 10 years, and there are large acreages of forest land in Wisconsin that have been classed as good sites for aspen growth. Maximum use can be made of these areas if tree-breeding research is able to develop well adapted, rapidly growing trees of high quality.

Late last winter forest areas in northern Wisconsin and northern Minnesota were searched for trees of outstanding quality. Traveling on snowshoes, the scientists located several dozen aspens in areas where arrangements could be made to spare the trees from cutting during the next 10 to 15 years. Twigs bearing flower buds were snipped from the tops of the trees to a height of 60 feet. Height, diameter, age, clear length, and other records were taken for each tree.

Back in the greenhouse in Beloit the twigs were placed in water to force them, and hybrid seeds developed after pollen from the catkins of a male tree had been dusted onto the catkins of a female tree. In the next few weeks these hybrid seeds—together with seeds and seedlings of white birch, sugar maple, and unhybridized aspen—were to be treated with a solution of colchicine. It is hoped that this treatment will improve the growth rate and the length of wood fibre of the wild trees on which the pulp and paper mills now depend.

Seed Production of Spruce Studied

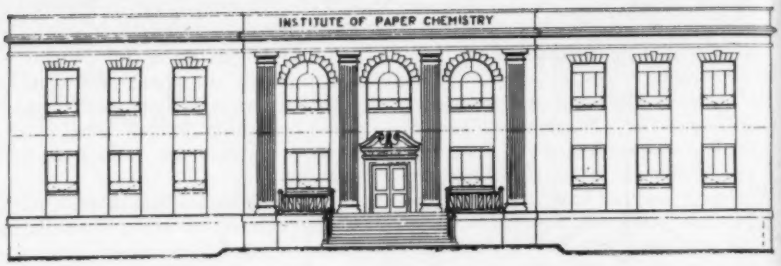
Data recently collected on the Kawishiwi Experimental Forest near Ely, Minn., has shown fairly accurately the amount of seed an individual spruce tree can produce in a heavy crop year.

Following the seed crop of 1948, a careful count was made of all the cones produced by an isolated, open-growth white spruce 15 inches in d.b.h. and about 75 years old. Squirrels began to cut off the cones on August 25, and on September 2 a sample of 20 such cones (dropped but not otherwise disturbed) was taken at random. These were opened slowly by artificial heat, and the seed obtained was stored at ordinary temperatures until November 7. At that time, it was placed—wings and all without cleaning—on moist filter paper in dishes and prechilled for about two months at 41F. Following this treatment, the seed was germinated at 70 to 80F. for 19 days. All seeds remaining ungerminated at the end of the germination period were then cut open to determine the number of sound ungerminated seeds.

Of the 1,306 seeds counted in the 20 cones, 414 germinated and 43 others were still germinable at the end of the test. The average production per cone was 22.8 viable seeds.

Cone fall continued through the fall of 1948 and during the following winter, summer, and fall. The total production of 1948 cones was found to be 11,874, of which all but about 650 had fallen by June 30, 1949. Applying the average yield per cone to the total cone production gives a total yield from this one tree of more than 271,000 viable seeds in 1948, the equivalent of about one pound of commercial clean seed.

This same tree bore a heavy crop of cones in 1944, lighter crops in 1946 and 1947, a medium crop in 1950, but no cones in 1945 or 1949. Trees of comparable age and size would produce fewer cones under stand conditions, but it is apparent that mature white spruce trees in northern Minnesota can produce a large number of viable seed in good crop years.



Appleton Institute Begins Construction

Ground was to be broken recently for the new $350,000 General Activities Center of the Institute of Paper Chemistry, Appleton, Wis. According to Westbrook Steele, Institute president, the building is to have slightly less than 21,000 square feet of floor space.

To be housed in the Center are the academic offices and seminar rooms, an accounting office, a secretarial office, a central file office, conference rooms, and the administrative offices of the Institute. In addition, the building will contain a museum, an assembly room seating more than 200 persons, space for duplicating facilities, and a sub-basement for storage. Space vacated in present buildings will be converted into laboratories. It is hoped that the construction will be completed by June 1953.

Forestry Notes

Prewar Stride
has been hit by reforestation activities, according to a report from the United States Forest Service. There were 456,370 acres planted in fiscal 1951, bringing the total acreage of reforested land in the country close to 7,700,000 acres.

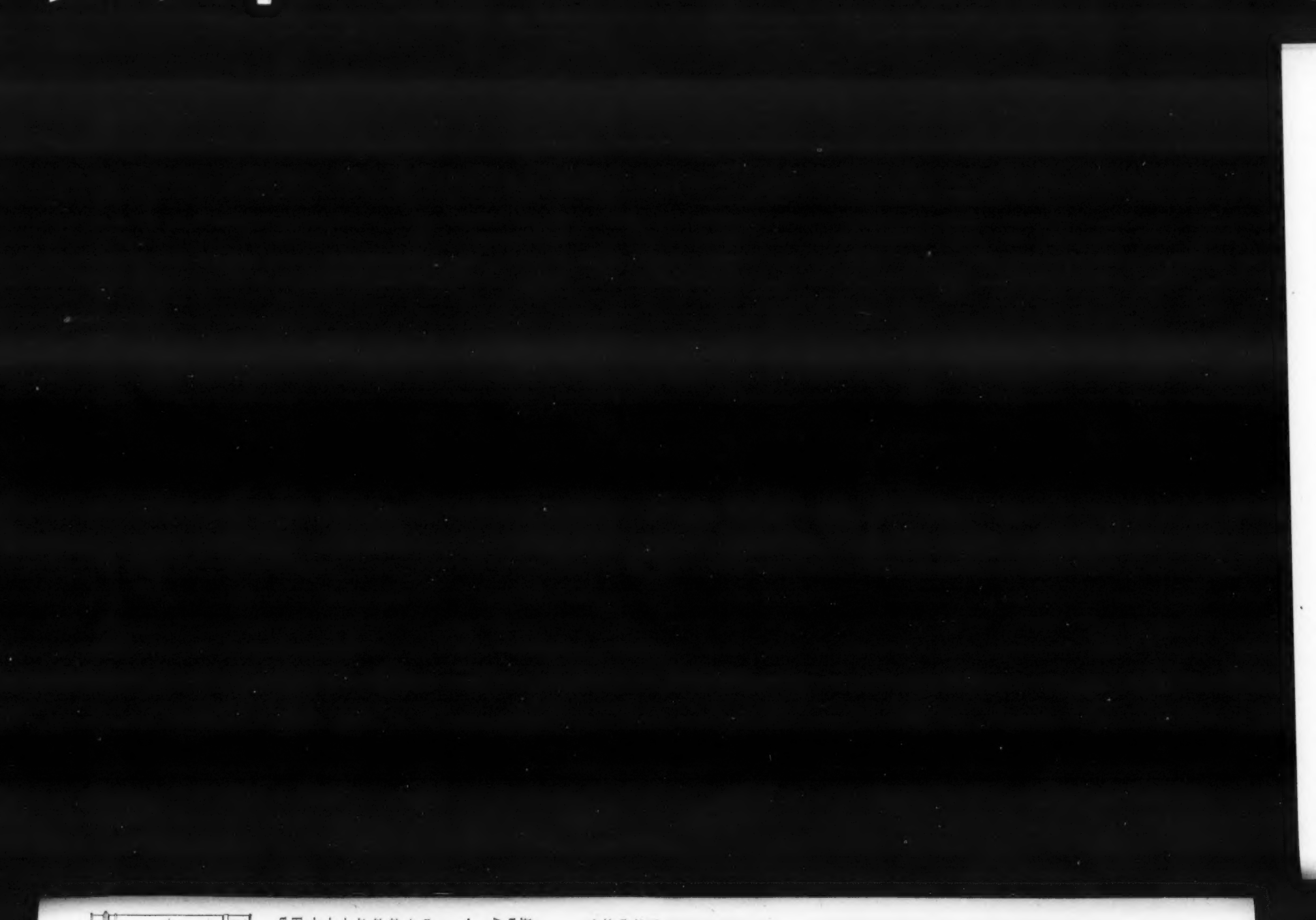
Macon Kraft Co.
and its subsidiary, Interstate Land & Improvement Co., Macon, Ga., are embarking on a program aimed at assuring adequate forest lands for the future. The management of the firms is engaged in planning for 1970 and 1980 so that needs may be met at that time. Already 5,200,000 pine seedlings have been planted and another 6,500,000 distributed free of charge to land owners. Along with the program designed to produce necessary raw materials in the future is a campaign being conducted for the promotion of forest fire prevention and protection.

Crossett Lumber Co.,
Crossett, Ark., and Southern Lumber Co. will cooperate with the Southern Forest Experiment Station at New Orleans in financing fundamental research in forest soils and genetics. The two firms will contribute during the next five years a total of $45,000. Other lumber and pulp concerns have also indicated an interest and may participate in the work. Most of the research will be centered at the Crossett branch of the Station and will be under the general supervision of R. R. Reynolds.

A White Pine Plantation
set out for erosion control in 1906 by students of the Biltmore Forest School in Asheville, N.C., today contains some of the fastest growing commercial timber anywhere in the United States. A growth of 92 cords per acre in 45 years has been reported. Trees not to be cut are marked in a thinning operation by Champion Paper & Fibre Co.

Forest Insect Research
is being conducted at a new laboratory recently established at Liberty, Tex. Studies are being made in a three-state area, comprising Arkansas, Louisiana, and Texas. Operated by the Forest Insect Investigations Division of the U.S. Bureau of Entomology and Plant Quarantine, the station is in charge of J. F. Cline.

Marathon Corp.,
Rothschild, Wis., has given a 60-acre forest to the vocational school at Wau-



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sau for use in studying proper forest practices. The tract has a 20-year growth of hardwoods and conifers ready for professional management.

Crown Zellerbach Corp.
has completed its seasonal planting and aerial seeding of 4,336 acres of logged-over land in the Columbia River area. A total of 827,000 seedlings were planted on five of the firm's Oregon tree farms, with the biggest operation at Clatsop, where about 252,000 went into the ground. A new experiment in offering pulp species seedlings to woodlot owners was a success. Seedlings were packed in bundles of 200 and offered at the company's cost of $1 a bundle.

South Dakota
has become the nation's 34th Tree Farm state. At seven simultaneous dedication ceremonies throughout the state, 29 private woodland owners received Tree Farm certificates in recognition of their outstanding forest management. More than 20,000 acres of the state's western pine and prairie shelterbelt privately owned woodlands now carry Tree Farm signs.

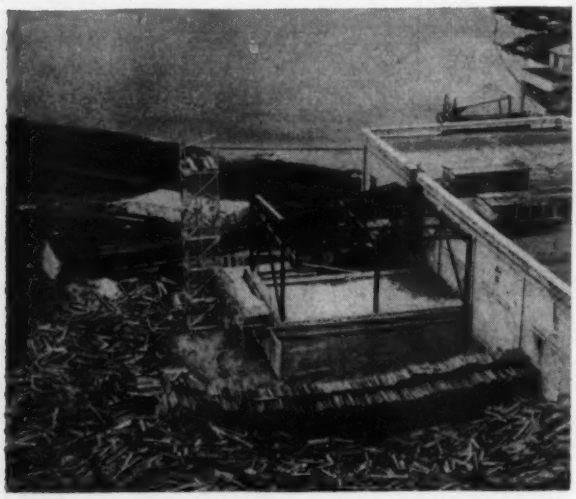
Mississippi Pulpwood Production
has shown a spectacular advance among the state's wood-using industries in recent years, according to a report issued by the United States Forest Service. Pulpwood production rose from less than 300,000 cords in 1936 to 1,300,000 cords in 1947. The state is now one of the nation's leading producers.

Southern Timber Supply
and industrial demand were discussed at a meeting between paper and lumber company officials and the U. S. F. S. at Atlanta July 10. Plans were made as to the best methods for meeting industry's requirements. Regional Forester Charles A. Connaughton of the Forest Service presided.

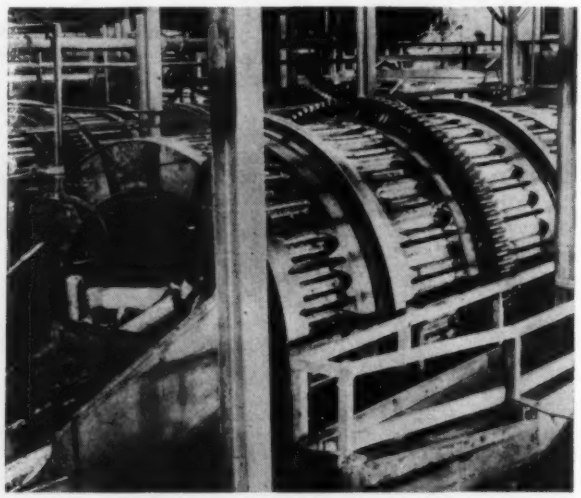
Georgia Forestry Officials
have reported that 26,000,000 seedlings were produced during the past year at the state's three nurseries, with more orders coming in than can be filled. Included in the seedling inventory are: slash, 19,413,451; loblolly, 6,189,585; longleaf, 258,427; shortleaf, 300,000; black locust, 150,970; red cedar, 118,600; Arizona cypress, 241,000; yellow poplar, 93,649; white pine, 173,000.

3,000 Pine Seedlings
furnished by International Paper Co. at Camden, Ark., have been set out by the Batesville, Ark., chapter of the Future Farmers of America.

Legislation Raising
from $500 to $2,000 the limitation on sale of national forest timber without advertisement and competitive bidding was recently signed by President Truman.



NEW BARK RECOVERY UNIT, one of the major modernizations at the Ontario-Minnesota Kenora newsprint mill in 1952; the unit adjoins the wood room



TRUNION TYPE BARKING DRUM recently installed by O-M at Kenora; low maintenance cost, it is hoped, will prove it an economical addition

Ontario-Minnesota Revamps Bark Recovery System

Highlighting a series of modernization projects at Ontario-Minnesota Pulp & Paper Co. Ltd's Kenora, Ont., newsprint mill is a major revamping of the existing bark recovery system. Aimed at an increase in quantity and quality of the paper produced, the improvements undertaken during the past year at the mill are part of a long-range program started in 1945. Since that time the parent company, Minnesota & Ontario Paper Co., has expended more than $29,000,000.

In reporting the Kenora modernizations, J. F. MacKellar, O-M vice-president and general manager, declared that the new bark recovery system will more efficiently remove the bark from the waste water before it goes into the river and will reduce handling costs. A 28 by 26-foot brick and steel structure to house the system is now in the process of completion. The new building is located adjacent to the woodroom. The system provides for the sluicing of the bark from the four 12 by 45-foot barking drums to a 5-foot diameter, 18-foot long circular dewatering screen. The screen has three-eighths inch perforations.

The bark from the screen is then carried to the chipper via a rubber belt. From the hog it is carried to the existing Nekoosa bark presses. Water, containing fine bits of bark, flows from the circular screen to a Tyler vibrating screen for removal of fines. After the bark is removed from the water, it is either pumped to the sewer or used as shower water on the barking drums.

The structural steel for the new recovery room was supplied by Dominion Bridge Co.; the circular dewatering screen by Port Arthur Shipbuilding Co.; the conveying equipment by Link-Belt Ltd., and the Tyler screens by W. S. Tyler Co.

Other Major Projects.

Additional modernizations started or completed this year include the installa-

tion of tubular type air heaters with separate I. D. and F. D. fans to provide better control on the furnaces. The equipment was supplied by Foster Wheeler Ltd. Also furnished by Foster Wheeler were "Bubar" type dust collectors on Nos. 3 and 4 boilers.

An improvement in wood handling is expected when the existing wooden conveyors are replaced by steel ones. The new trusses and steel troughs will relieve the congested area in the wood yard. Steel fabrication is by Vulcan Iron & Engineering Ltd. of Winnipeg.

Major step in the improvement of the quality of pulp to the paper machines was the installation of tile lining and propellor agitators in the groundwork decker chest. Before this installation, the stock was in contact with concrete walls, and the old paddle agitators provided inadequate stock agitation, with heavy stock accumulation resulting. The agitators and drives were supplied by Sherbrooke Machinery Ltd.

With the replacement of six old 2A Bird screens with five 3A screens on No. 8 machine, the program to replace screens on both paper machines at Kenora has been completed. The higher head in the head box has improved formation and density of the sheet due to the increased water suspension at the sluice. Canadian Ingersoll-Rand supplied the Bird screens.

Replacement of dryer motors is part of a program that will result in a general speedup of all drives from 1,000 to 1,500 feet a minute. The original drive on each machine was designed for 1,000 feet per minute. Considerable overloading resulted when the original drives were stepped up to 1,375 feet a minute. The new paper machine drive is of Harland manufacture, and the replacement motors are supplied through Bepco of Canada Ltd. New dryer control panels are also being installed.

To provide better speed control between the various sections on No. 9 paper machine, it was necessary to replace the mechanical type control with a modern electrical differential regulator type. Additional power needed to increase drive speeds will come from a new 750 kw turbo-generator. It will replace the present 600 kw generator. The new generator is being supplied by Canadian General Electric Co. Ltd. and the master shaft by Bepco of Canada.

A new heat recovery system is being installed that is designed to blow the exhaust vapors from the hood through the economizer sections. This type of system does not lend itself to hot water heating. It will be equipped with water sprays for recovering additional heat. A new air distribution system will force fresh air to the basement and operating floors. This equipment is to be supplied by Ross Engineering of Canada Ltd. Ross will also furnish ventilating systems to improve working conditions in both the sulphite mill and screening room.

Newsprint Rolls from New British Columbia Mill

On June 10 the first newsprint rolled from one of the world's fastest machines. The occasion was the unofficial opening of the new $21,000,000 Elk Falls Co. mill at Duncan Bay, B. C. The plant, which will eventually be developed into a $40,000,000 project, will produce 2,000 feet of paper per minute and 320 tons of newsprint a day.

The new firm was formed through the partnership of Canadian Western Lumber Co. and Pacific Mills Ltd. Canadian Western owns Fraser Mills, one of the largest sawmills in the world, and Pacific Mills operates a paper mill at Ocean Falls and two finishing plants in Vancouver. For the present, wood for the new plant is being obtained through salvage operations; timber from the Duncan Bay license will be used later.

This is the 12th pulp and paper mill to come into operation in the province. Other developments are underway for Castelgar, Prince George, and Quensel.

NEW TUG launched recently by Kingcome Navigation Co. Ltd., a subsidiary of Powell River Co.; ceremonies at the launching were attended by company and government dignitaries, including M. J. Foley, executive vice president of Powell River

Powell River Launches New Log-Towing Tug

Bringing to seven the number of tugs directly engaged in log-towing and pulp shipments in and out of Powell River, B.C., Powell River Co. recently launched the *M. V. Kincome*. A 100-foot vessel, she is the first steel tug of any size to be built in British Columbia since the close of World War II.

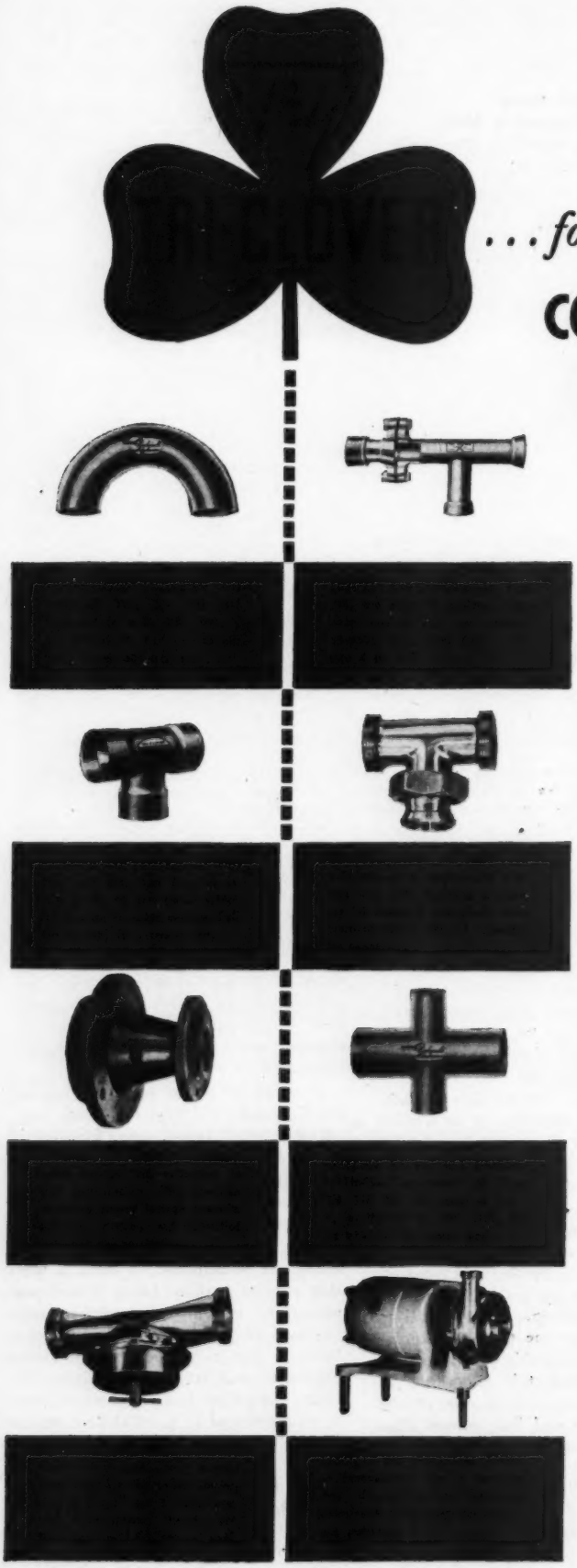
Commenting on Powell River's decision to add the new tug to its wholly owned subsidiary, Kingcome Navigation Co. Ltd., and its auxiliary fleet of 23 tugs servicing the numerous logging camps, President Harold S. Foley stated: "The new tug is essential to meet the increasing pressure on our log-towing facilities, resulting from the expansion of our properties and production. It has always been a principle of Powell River Co. policy to use the skill and know-how of British Columbia workmen, and we have followed this procedure in awarding this contract to one of the province's oldest and best known shipbuilders, Yarrows Ltd. of Victoria."

Latest Equipment

All the latest equipment and furnishings have been incorporated in the construction of the tug. Her steel hull, with 25-foot 6-inch beam and a maximum draft aft of 13 feet 6 inches, was electrically welded. The wheelhouse is of aluminum, making use of the Argon gas shielded arc and aircromatic welding process. Where aluminum joins the wheelhouse, the plate next to the aluminum is galvanized with a riveted insulated joint to offset possible compass variations.

Powered by a 700 hp diesel engine, the *Kingcome* will have full-power towing at approximately 6 knots for a maximum distance of about 4,300 miles. Running free, her radius of action will approximate 8,100 miles.

Operated electro-mechanically, her Sperry steering can be controlled from either the wheelhouse or from a midship steering position. Other wheelhouse equipment includes the mechanically-operated engine room telegraph and a binnacle with a "fathometer" indicating depths to 660 feet. A 14-inch searchlight, controlled from the wheelhouse, is supplemented by a 1,000-watt searchlight fitted on the boat deck. The tug's electric towing winch on the main deck has a drum capable of accommodating 1,600 feet of 1⅜-inch steel wire. Two class "1A" lifeboats and a 14-foot work boat with a 25 hp engine are carried by



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FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

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the *Kingcome*, along with the latest in life-saving equipment.

Modern Quarters

Close personal attention to the comforts of the ship's company of nine was given throughout its planning and construction by F. L. Kurtz, general manager of Kingcome Navigation, with the result that each crew member is provided with a separate cabin, eliminating the old double-decker bunks and consequent lack of privacy.

The ship is heated by an automatic hot water system, with radiators in each room. Hot and cold fresh water is available in cabins provided for the captain, the chief and second engineers, the first officer, and the cook. A common mess and galley, equipped with an oil range, built-in freezer, and cooler, are among other features of the new craft. All personnel accommodation can be entered from inside the steel deckhouse.

Pulp Mill Sought for Saskatchewan

It was reported in the Regina, Sask., *Leader-Post* recently that the Saskatchewan government, through its Industrial Development Office, was trying to interest private capital in building and operating a pulp mill in the northern region of the province.

The newspaper declared that interest had been shown by companies in Switzerland, the United States, and Canada. It said that the efforts had not reached the agreement stage, but that there had been "several bites" by U. S. interests.

Proposed Alberta Mill May Be Expanded

Plans for a $6,000,000 pulp mill at Yates, Alta., about 120 miles west of Edmonton, may have been expanded to an expenditure of $20,000,000. It has been reported that Richard Randall, president of International Resources Ltd., which is proposing construction of the mill, was to have announced the intentions of his firm late in July.

Initial plans were announced several months ago. The company has been granted a contract by the provincial government covering construction of the mill and assuring the supply of timber required to operate it.

Timber Rights Sought by B. C. Mining Industry

British Columbia mines are currently fighting for the right to cut timber within the new forest management license areas. Timber cut by mines is used for construction and underground work.

The mining industry is asking the provincial government to make a ruling allowing it to cut timber in license areas, or else to exclude timber in the mining areas from the license tracts. At issue now is the area around the northern end of Kootenay Lake, which has been applied for by Celgar Development Co., affiliated with Celanese Corp. of America. The mining association is requesting that timber within the mining district be excluded from Celgar's license.

1951 Outstanding Year in B. C. Pulp and Paper Industry

New developments and extensive modernization and expansion programs combined to make 1951 one of the most sensational years in the history of the pulp and paper industry of British Columbia. It is estimated that $280,000,000 is the current capital investment potential in the province.

Newsprint has traditionally been the important commodity from the mills, but during the past 26 years the trend has been steadily towards other products. For example, in 1925 the total tonnage of pulp and paper was 225,000, of which 80 per cent was newsprint. In 1951, the total tonnage was 962,787, and only 40 per cent of this was newsprint. Newsprint production has been on the increase, but its percentage in relation to total production is decreasing. This is due in part to the trend towards diversification in the industry.

Mill ownership has also changed extensively. Six companies were operating seven mills five years ago, while today there are 10 companies operating 12 mills.

Chief products of the industry are newsprint, dissolving or rayon pulp, bleached and unbleached sulphate pulp, sulphite pulp, hardboard, boxboard, wrappings, tissues and specialty products, building papers, and roofing felts.

Full Integration

Most of the mills are trying for full integration to obtain as much utilization as possible. With the growth of the pulp and paper industry, small material and salvage material may be used. Plans for sustained yield in forestry practices are becoming more and more common.

About 60 per cent of B. C.'s production goes to the United States, with 25 per cent directed at foreign markets, leaving 15 per cent for domestic use. These exports exceed in value all others in Canada.

The industry consumes approximately 725,368,000 fbm per year, about 20.9 per cent of the total log cut in the coastal areas of the province. Of this, 88.18 per cent last year was hemlock and balsam, 9.9 per cent was spruce, and 1.3 per cent was Douglas fir, cedar, and other species. With approximately 21 per cent of the forest production, the pulp and paper industry produced more than 25 per cent of the total value of forest products.

At the present in British Columbia there are about 13 pulp and paper projects now under construction or in the planning stage. This constitutes the largest new construction program of any similar region in the world.

Canadian Notes

Anglo-Canadian Pulp & Paper Mills Ltd. plans to enlarge its mill at Chandler, Que., at a cost of $4,500,000. The mill is the largest industry of the Gaspé Peninsula.

Alaska Pine Co. Ltd. was to have resumed operations recently at its pulp mill in Woodfibre, B. C., after a shutdown of about six weeks. Reason for the closing was a lack of orders and the need for repair work.

B. C. Pulp Prices have dropped considerably from last year's levels. Last year bleached sulphate pulp sold at $177.50, compared with $129 a ton at the mill now. Unbleached sulphate pulp was $145 a ton and is down this year to $81.50 on a contract basis. Prices have dropped in accordance with cuts in the Scandinavian price.

Canadian Pulp Output for the first four months of 1952 amounted to 3,024,875 tons, against 2,948,526 for the like period in 1951, according to the Canadian Pulp & Paper Association. Total output declined 4 per cent in April, as compared with March, with all products slightly lower. Exports of all pulps declined a total of 23,150 tons in April from March.

June Newsprint Statistics

Production of newsprint in Canada (including Newfoundland) during June 1952 amounted to 451,915 tons and shipments to 483,791 tons. Output in the United States was 99,080 tons and shipments 98,138 tons, making a total North American production of 550,995 tons and shipments of 581,929 tons, compared with continental production of 558,663 tons and shipments 572,308 tons in June of last year, according to figures released by the Newsprint Service Bureau. There was one work day less in June this year than in 1951.

The Canadian mills produced 75,220 tons more in the first six months of 1952 than in the corresponding period of last year, which is an increase of 2.7 per cent. The output in the United States was 36,879 tons, or 6.7 per cent, greater than that of January-June in 1951, making a total continental increase of 112,099 tons, or 3.4 per cent, over the comparable period last year.

Stocks of newsprint paper at the end

of June were 141,805 tons at Canadian mills and 9,568 tons at U. S. mills, making a combined total of 151,373 tons. This compares with 182,307 tons on May 31, 1952, and 142,500 at the close of June 1951.

Industry Notes

Weyerhaeuser Timber Co.
has established the Weyerhaeuser Timber Foundation to provide scholarships for children of employees. The one-year grants, offered this year to 10 high school graduates, are worth up to $1,200, depending on the college attended.

Bergstrom Paper Co.
at Neenah, Wis., was shut down recently as the result of the explosion of the auxiliary switchboard in the turbine room. There were no casualties and no damage other than that to the switchboard itself.

Kimberly-Clark Corp.'s
employee magazine, *Cooperation,* has received an award for excellence in the 1952 Wisconsin House Publication Contest sponsored by the University of Wisconsin school of journalism, the Wisconsin Industrial Editors' Association, and the Wisconsin Manufacturers' Association. The magazine was started as a safety publication 35 years ago under the direction of S. F. Shattuck, who served as editor until his retirement.

St. Regis Paper Co.
now holds an undivided half interest or more in oil and mineral rights on 277,000 acres in southern Alabama and the Florida panhandle, according to Roy K. Ferguson, president. Geologists have been engaged for consultation and advice, and discussions are under way with a number of oil firms dealing with plans for exploration and development.

Lowell Textile Institute,
Lowell, Mass., presented two degrees in paper engineering at its commencement June 9. They were the first such degrees to be awarded by the Institute. One of the recipients, Alfred K. Hobbs of New Rochelle, N.Y., will become a member of the Institute's staff as an instructor.

Increased Use of Kraft
paper from southern pines was predicted at Atlanta, Ga., recently by Arthur Harris, president of Atlanta Paper Co. He said that the development of chain store distribution and the rapid industrialization of the South in recent years have accounted for the growth in the packaging industry.

With Only 6 Per Cent
of the world's population, the United States now uses 68 per cent of the world's output of paper and paperboard.

ESTIMATED NEW "FREE WORLD" SULPHUR PRODUCTION -- 1952-55*

(Long Tons of Sulphur)

	Estimated Total 1951 Production	Estimated New Capacity 1952-1955		
		Brimstone	Other Sulphur	Total
United States	6,180,000	1,058,000	174,700	2,082,700
Canada	329,000	40,000	164,000	204,000
Mexico	52,000	226,000	3,000	229,000
Total North America	6,561,000	2,124,000	341,700	2,465,700
Europe	3,730,000	154,000	1,088,000	1,242,000
Asia	1,200,000	107,000	92,000	199,000
South America	56,000	63,000	6,000	69,000
Oceania	105,000	-	42,000	42,000
Africa	44,000	-	23,000	23,000
Total Other Areas	5,135,000	324,000	1,251,000	1,575,000
"Free World" Grand Total	11,696,000	2,448,000	1,592,700	4,040,700

*Estimates based on published information and trade sources. July 1952.

Sulphur Shortage Virtually Ended, Manufacturer Reports

THE WORLD SULPHUR SHORTAGE, critical since the outbreak of the Korean War, has improved to the point where virtually all sulphur requirements in the United States are being met, Langbourne M. Williams, Jr., president of Freeport Sulphur Co., reported recently.

Furthermore, he added, the outlook for the future is "extremely encouraging" as a result of nearly 100 new projects in this country and other free world nations that will substantially increase the supply of the mineral in various forms.

These projects, it is estimated, will add approximately 4,000,000 long tons of sulphur per year by the end of 1955. This amount is equivalent to one-third of the estimated 1951 free world production of about 12,000,000 tons of sulphur in all forms.

"The large gap between sulphur supply and demand no longer exists," Mr. Williams declared. "Although sulphur consumption is still under government limitation, all but a few consumers in this country are getting all the sulphur they need, and the situation abroad has also improved.

"The outlook for the future is extremely encouraging. There is enough new production in sight to dispel the threat of a continuing shortage. Even if the requirements of U.S. industry and agriculture should increase by 1955 to the level estimated by DPA there will be enough sulphur to meet the demand, assuming the new projects measure up to expectations."

The new projects listed by Freeport officials are expected to add approximately 1,500,000 long tons of sulphur in various forms to the annual production capacity of the free world by the end of this year, 1,350,000 tons more by the end of 1953, 250,000 tons more by the end of 1954, and 900,000 tons more by the end of 1955.

The efforts to increase the supply, he said, cover a broad range of activity. They include five Frasch process salt dome projects in Louisiana and Texas, which with an estimated annual production of 1,370,000 tons of sulphur are making the largest contribution. The bulk of the production will be under way by the end of 1953.

In addition, Mr. Williams continued, there are under way 50 projects to obtain sulphur in the form of brimstone from native deposits, sour natural gas, refinery gases, etc., and 37 projects to obtain sulphur in various other forms.

The DPA has set a goal for annual production in the U.S. by 1955 of 8,400,000 long tons of sulphur in all forms. It has estimated that domestic requirements would increase to 43 per cent above 1950, or to about 7,000,000 long tons, which would leave about 1,400,000 long tons for export. The DPA forecast is predicated on a rate of growth much greater than that on which the 1955 estimate of the President's Materials Policy Commission was predicated. But even if demand should increase by 1955 to the level estimated by DPA as representing the requirements of U.S. industry, the new projects in the United States will provide enough additional sulphur to meet this level, and at the same time the foreign projects listed will reduce the export requirements that would otherwise exist.

Government Encourages Increased Sulphur Output

The OPS has taken action to increase the production of elemental sulphur by non-Frasch methods. Added sulphur output is urgently needed and is obtainable only from deposits not considered economically workable at existing ceiling prices. The new OPS ruling establishes ceilings for marginal sulphur producers that are higher than the prevailing level. The ceiling for marginal producers is the average total cost plus a reasonable profit

GOING FISHING

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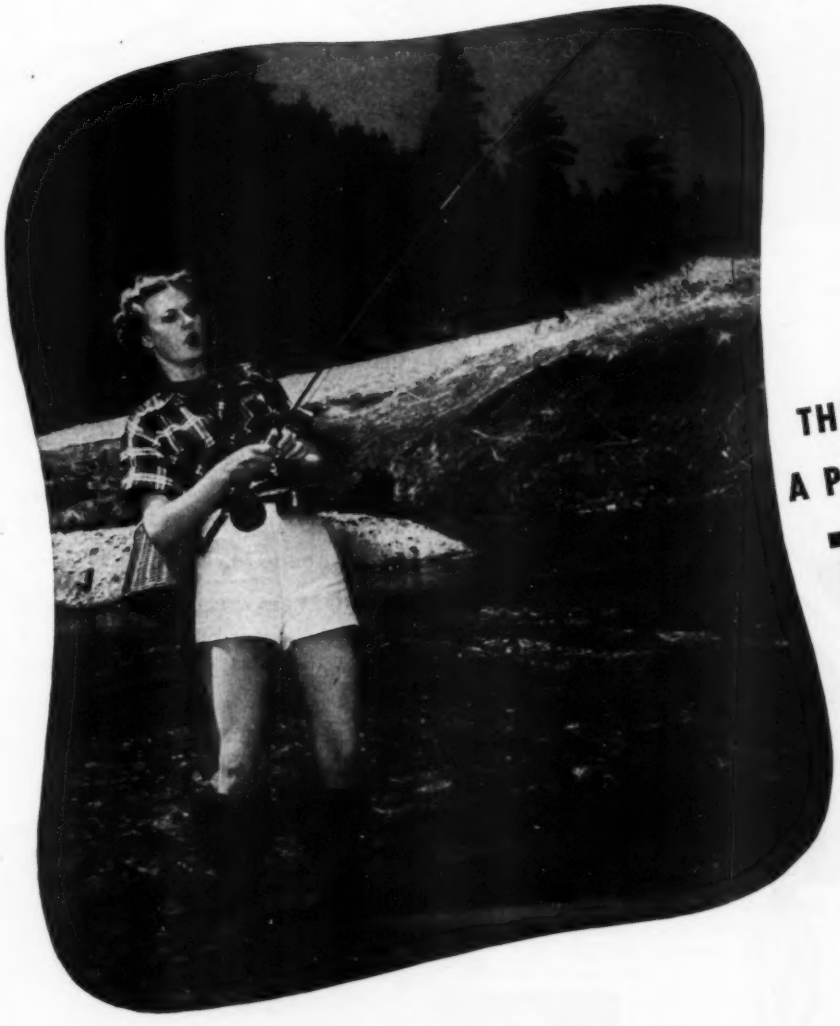

THEN...FISH FOR A PRIZE IN THE BIG TENAX CONTEST!

While you're packing your rods, reels and lures—in pleasant anticipation of those big ones you're going to catch—be sure to tuck in several entry blanks for the Tenax Fishing Contest!

You'll want to have them handy—ready to send in your entry at once and be in line for one of the 46 valuable prizes when the contest judges make their decision in October.

It's *your* contest, remember—open *only* to employees of paper, pulp and paperboard mills anywhere in the U.S.A. So, get your entry blanks at your own mill now ...and let's go fishin'!

46 BIG PRIZES!
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10 H. P. JOHNSON OUTBOARD MOTOR
15 1st PRIZES—$100 SAVINGS BOND
15 2nd PRIZES— $50 SAVINGS BOND
15 3rd PRIZES— $25 SAVINGS BOND
As soon as you catch a whopper, send in your entry!
LOCKPORT FELT CO., NEWFANE, N. Y.

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A "perfect fit" pays off . . . whether it's trying on shoes for Prince Charming or selecting supplies for paper production.

Even without a magic wand, you can be *sure* that the corn products you use are *exactly* right for each of your processes. Anheuser-Busch not only offers you a complete line of *standard* starches and other corn products for paper mill use, but also will *tailor-make* a special formula or product to your specifications.

And, standard or special, all products bearing the Anheuser-Busch name assure you of the dependability and uniformity that have *built* our world-famous reputation for highest quality.

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ANHEUSER-BUSCH, INC.

CORN PRODUCTS DEPARTMENT

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margin for export sales and sales for export. The higher priced sulphur will move into foreign markets, and the price in the United States is not to be affected.

Frasch production of sulphur in this country is at capacity level, and its price remains unaffected by the latest action. Also unaffected are the prices of sulphur recovered from natural gas, refinery gases, and petroleum. The Frasch process, by which most domestic sulphur is now produced in practically pure form, forces superheated water underground to melt the element and bring it to the surface.

Sulphur is rated by the International Materials Conference as a strategic material in critically short supply and is allocated domestically by the National Production Authority. These allocations are based on 90 per cent of the 1950 consumption.

Quebec Lingosol Plant Now in Production

A $250,000,000 plant to produce lingosol from a by-product of Quebec's pulp and paper industry was officially opened June 11 in Quebec City by Lingosol Chemicals Ltd. The plant is producing the chemical from spent sulphite liquor supplied by the near-by mill of Anglo-Canadian Pulp & Paper Ltd. In addition to Anglo-Canadian, Anglo-Newfoundland Development Co. is also financing the venture.

Lingosol, which may be had in either liquid or powder form, is used in road building as a soil stabilizer; in the manufacture of leather; as a dye leveling agent; as a cement dispersant, an adhesive for gummed tapes, a ceramic plasticizer, a foundry core binder, and as an additive in electrolytic copper refining.

Of the annual capacity of 22,500 tons, some 40 per cent is exported to the U. S.

Colton Chemical Opens New Polyvinyl Plant

The Colton Co., Cleveland, announces the opening of a plant for the production of polyvinyl alcohol under the trade name, VINOL. The chemical is used extensively in the paper, packaging, adhesive and textile industries.

Colton's new four-story plant incorporates the latest developments in vertical flow and airveying systems. These improved facilities have stepped up the production of Vinol dry resin powder to a point where the firm is now one of the major manufacturers of polyvinyl alcohol.

In order to maintain a high production rate, Colton is currently offering two standard grades. These are designated as VINOL FH-400, a medium grade fully hydrolyzed type, and FH-500, a high viscosity fully hydrolyzed type.

1,297,204 MAN-HOURS without a disabling injury wins for Plant No. 3 in the Construction Machinery Division of Chain Belt Co., Milwaukee, the National Safety Council Award of Merit; A. W. Bathke (right), Chain Belt safety director, watches as A. Wendle, erection plant superintendent, presents the award to H. L. Riley, a member of the plant safety committee and representative of its 300 workers.

Cowles Grants Black-Clawson Manufacturing Rights

The Cowles Co. Inc., Cayuga, N. Y., has announced the licensing of The Black-Clawson Co. Inc., Hamilton, Ohio, to manufacture and sell three recently developed Cowles products.

The products covered by the licensing agreement include: the Cowles Aquapulper, a unit that pulps and defibers hard stock; the Beatapulper, which pulps, defibers and refines paper stock in one operation, and the Classapulper, a new continuous unit that will pulp and defiber virgin pulp and wastepaper while retaining undefibered and foreign materials.

All three Cowles products will be manufactured by the Shartle Bros. Machine Co., a Black-Clawson division at Middletown, Ohio. Under the licensing agreement, they will be sold under the Shartle name and known as the Shartle Aquapulper, the Shartle Beatapulper, and the Shartle Classapulper.

The agreement was arranged, according to President Edwin Cowles, to permit increased production and speedier delivery of the products, which, it was announced, Cowles will continue to manufacture.

Graver Expands Technical Organization

Graver Water Conditioning Co., New York, N. Y., has announced further expansion of its technical organization to extend its services to central power generating stations, industrial plants, and municipalities. A new Research and Development Department has been created under the direction of Vincent J. Calise, who has developed many of the firm's equipment designs since its establishment as a division of Graver Tank & Mfg. Co.

Marvin Lane has been advanced to the position of technical manager. He has specialized for many years in water conditioning laboratory, pilot plant, field experimental, and plant operating work and has been the company's chief chemist since 1949. Mr. Lane's responsibilities will include design development, process standards and guarantees, water treatment recommendations, and analysis of installation performance. William J. Lewis is to be in charge of the Customer-Service Department.

Wheelco Instruments Div.,
Barber-Colman Co., has completed the transfer of all manufacturing and operating facilities to Rockford, Ill.

Wyandotte Chemicals Corp.
announces that a pre-doctoral study fellowship in organic chemistry has been established at Wayne University, Detroit. The award carries an annual stipend of $1,200 plus tuition and fees.

The Bagley & Sewall Co.,
Watertown, N. Y., has four large fourdrinier paper machines under construction, two are now being shipped for Austrian mills, and one more, the second largest ever built by the firm, was just ordered by a paper firm in Finland. At capacity operation of six days a week and 24 hours a day, Bagley & Sewall has a full force of approximately 675 men at work.

J. O. Ross Engineering Corp.
has opened an office in the Skinner Building, Seattle. K. H. Jones is in

charge of the branch, where he will supervise the design and installation of Ross air systems, industrial ovens, dryers and heaters.

Beckman Instruments Inc.,
South Pasadena, Cal., has announced the opening of a large new plant devoted exclusively to the manufacture of synchros and associated components. The firm is currently in production on a number of synchro types, including Army Types II and XV, repeater and transformer units.

R. S. Aries & Associates,
New York, N. Y., chemical engineers and economists, have established a regional office in San Antonio, Texas. Operations are being directed by Alden H. Waitt, vice president.

Hewitt-Robins Inc.,
New York, N.Y., has purchased the outstanding stock of Korb-Pettit Wire Fabrics and Iron Works, Inc., Philadelphia. Korb-Pettit produces woven wire fabric screen cloth and spiral woven wire conveyor belts.

Minneapolis-Honeywell Regulator Co.
has announced that a research center has been established in Philadelphia by the Valve Division to support an extensive development program in industrial valves. The test and research equipment, housed in a two-story brick building, will evaluate present valve design and performance, as well as implement research into new valve types to parallel advances being made in modern process control.

Semet-Solvay Division
of Allied Chemical & Dye Corp. has announced that ground has been broken for a $7,000,000 synthetic wax and synthetic benzol plant in Tonawanda, N.Y. The installation, to be completed by the spring of 1953, will comprise seven or more buildings. Major structures will include a processing plant, laboratory, machine shop, and locker building.

Beckman Instruments Inc.
has moved its Chicago offices to new and larger quarters at 7145 W. Belmont Ave. This Midwest branch maintains complete factory service facilities for all Beckman instruments and is under the direction of George Kincaid.

Conoflow Corp.,
Philadelphia, has appointed the following new representatives: Bruce Graves Co., St. Louis; Instrument Sales Corp., Seattle, and Equipment Sales Corp., Kingsport, Tenn.

Chain Belt Co.,
Milwaukee, held open house June 7 at the 15 plants of both its Milwaukee and West Milwaukee works. Nearly 100,000 persons attended the event.

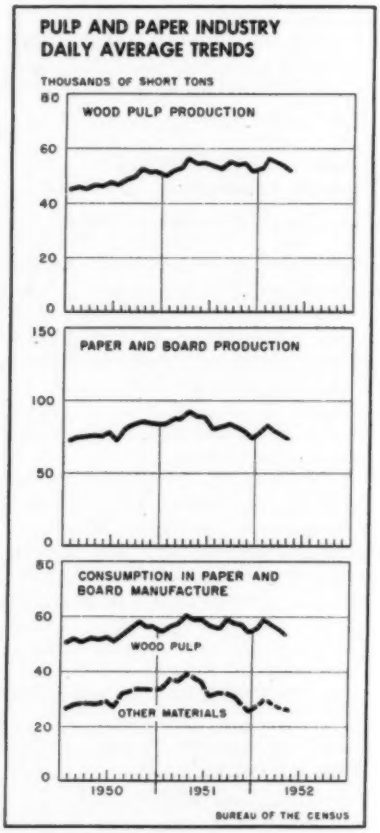
U. S. Paper and Paperboard Production

	May 1952 (tons)	Apr. 1952 (tons)	May 1951 (tons)	Total 1951* (1,000 tons)	Total 1946 (1,000 tons)
Paper and Board, total	2,010,785	2,014,008	2,409,225	26,086	19,278
Paper, total	915,150	940,357	1,007,475	11,622	8,752
Newsprint	98,523	90,141	96,373	1,106	773
Groundwood paper (uncoated)	68,753	74,913	66,982	789	776
Printing and converting (coated)	93,937	93,823	95,828	1,115	486
Book paper (uncoated)	125,378	126,878	143,731	1,622	1,447
Fine paper (writing, cover and text, bristols, thin paper and other)	115,768	116,076	117,834	1,364	1,160
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment and other)	269,053	277,891	303,725	3,597	2,690
Special industrial paper	31,858	35,477	39,142	419	272
Sanitary paper	87,181	97,826	105,644	1,215	861
Tissue paper	15,444	17,970	25,750	270	184
Absorbent paper	9,255	9,362	12,466	124	103
Paperboard, total	862,983	855,179	1,115,492	11,605	8,396
Containerboard, total	460,681	448,098	608,514	6,347	4,315
Liners	307,324	301,847	396,389	4,205	.....
Corrugating material	130,233	124,087	175,942	1,815	.....
Container chip	23,124	22,164	36,183	328	.....
Bending board (folding boxboard)	256,462	255,066	327,868	2,429	2,317
Non-bending board (set-up boxboard)	58,237	62,000	85,038	701	521
Cardboard	6,185	6,093	7,531	79	89
All other paperboard	81,018	83,194	86,541	2,049	1,154†
Wet machine board	11,832	11,578	13,895	144	138
Construction paper and board, total	220,820	206,894	272,363	2,716	1,992
Building paper and insulation	113,596	110,321	141,003	1,401	1,036
Hardboard and insulating board	107,224	96,573	131,360	1,315	956

(*) Preliminary report. (†) Includes bending and non-bending board not for use in box plants. *Source: U.S. Department of Commerce.*

May Pulp, Paper and Board Production

Paper and board production during May amounted to 2,010,785 tons, according to a report released by the Bureau of the Census. This is 17 per cent less than the tonnage produced in May a year ago. In terms of production base capacity, the industry operated at 69.7 per cent in May, with the paper and paperboard sections operating at 76.1 and 63.9 per cent, respectively. The comparable ratios for April were: Total, 73.5 per cent; paper, 81.2 per cent, and paperboard, 67.8 per cent.



Pulpwood receipts at the pulp mills during the month were 1,906,941 cords, with consumption at 2,250,981 cords. Month-end inventories decreased 6 per cent to 5,247,987 cords.

Wood pulp production during May amounted to 1,400,484 tons. In terms of production base capacity, pulp production ran at 79.8 per cent, as compared to 82.8 per cent in April.

Wood pulp inventories at the end of May at the paper and board mills increased slightly to 557,960 tons. Month-end stocks at the pulp mills increased from 127,527 tons to 138,452 tons.

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Exact-a-load applies an accurate load on all types of rolls . . . and keeps it accurate — within closer limits than ever before.

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Simple to operate, roll pressures can be set *exactly* — front and back independently.

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from pulp logs

to paper

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When you select your equipment from the complete Chain Belt Line, you're sure to get equipment which is best suited to your particular applications. If you need chain, you won't be paying for unnecessary chain strength, nor will you be penalized by premature chain failures. You'll get the one that is best for your mill. If you're interested in belt idlers, bucket elevators, spray nozzles or a complete conveying system, you have a similar wide range of selection.

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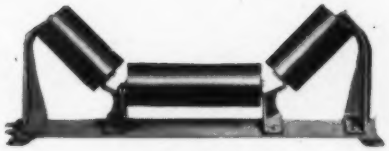
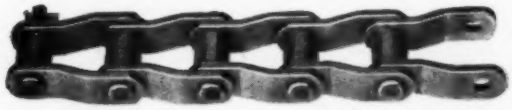
BALDWIN-REX®

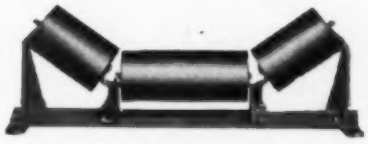
REX® COMBINATION DUROBAR® CHAIN has inside block links of malleable iron or Rex Z-Metal, and side bars of high carbon steel. These husky chains are great favorites for all types of conveyor service in pulp and paper mills. Eccentric barrel construction makes for better sprocket action and greatly reduces chain wear.



REX WOOD CHIP IDLERS are sloped to a steep 45° angle to greatly increase belt capacity. Chips can be piled higher and loaded closer to the belt edge without fear of spillage. Have same long-life design features as Rex standard idlers.



REX CHABELCO® STEEL CHAIN combines relatively light weight with high strength. It is used in both drive and conveyor service . . . can handle heavy loads and withstand severe shock and vibration. For those really tough jobs, you can't beat Rex Chabelco.



REX STANDARD TROUGHING IDLERS are used for wood chip, bark and pulp handling. Roller or ball bearing equipped interchangeable rolls are supported in brackets of unbreakable malleable iron. Triple labyrinth grease seal keeps grease in . . . dirt out.

BALDWIN-REX® ROLLER CHAIN is a high strength precision steel chain suitable for high speed drive service. It is available in single, double, triple and quadruple strand in a complete range of sizes and strengths to suit every driving requirement. Pitch range is from ¼" to 2½".

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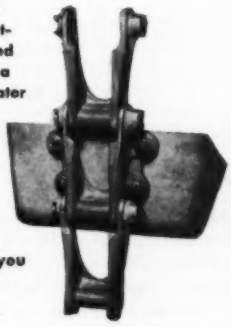
REX FLAT SPRAY NOZZLES are ideal for cleaning logs as they emerge from woodyard or log pond. Their hard-hitting, knife-like sprays of water effectively remove sand, gravel, dirt and grit from logs. Special design permits maximum impact value with low water consumption.

REX BUCKET ELEVATORS are widely used for elevating wood chips, refuse and similar material. There is a Rex Standard Bucket Elevator to meet virtually every requirement of the pulp and paper industry. All major components . . . buckets, chains, sprockets, housing, etc. . . . are manufactured by Chain Belt Co., assuring you a uniform, reliable, easy to maintain unit.



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View of the Little Rapids mill, showing a portion of the United States government Little Kaukauna lock and dam

Little Rapids increases groundwood bleaching capacity

R. L. LEAF JR.
Resident Manager
Little Rapids Pulp Co.

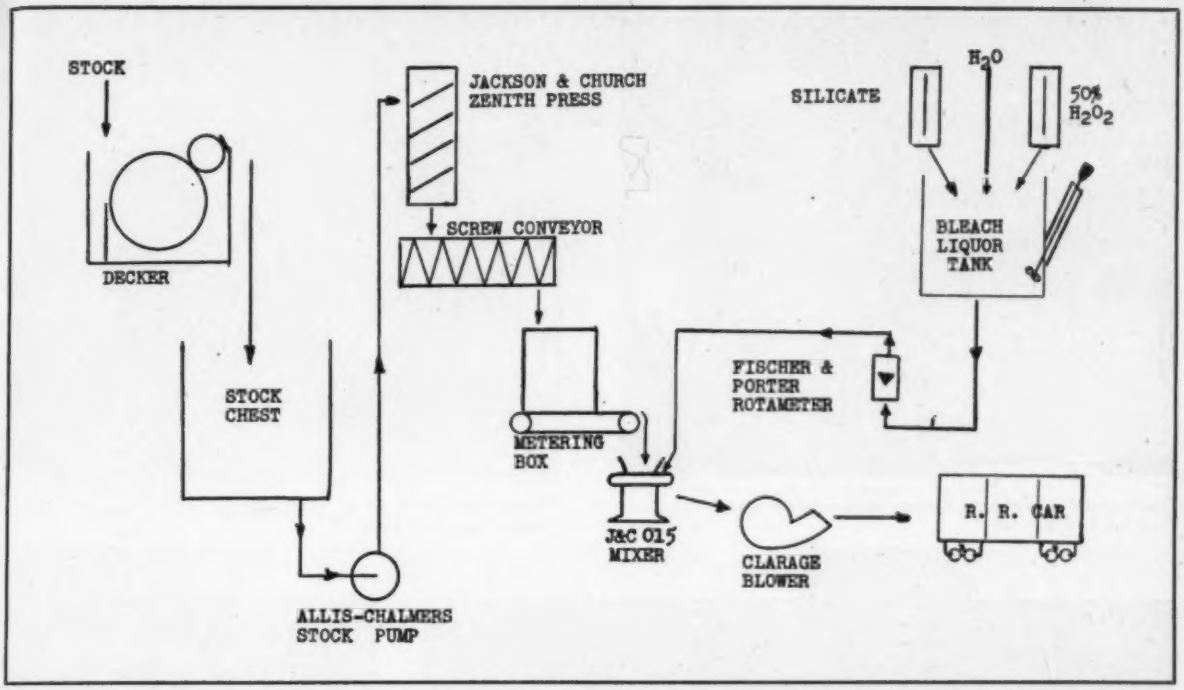
MARKET BLEACHED GROUNDWOOD PULP has been manufactured for more than one year by Little Rapids Pulp Co., West De Pere, Wis., using a new process which was developed through the cooperation of Buffalo Electro-Chemical Co., Jackson & Church Co., and Little Rapids. The commercial pilot unit has been expanded so that it will now handle 30 tons per day.

The pulp is bleached by the Beecco cold steep bleaching system. In this system peroxide bleach liquor is applied to high density pulp, the pulp is allowed to stand for several days (or more), and the pulp is then ready for the papermaking operation without the necessity of the normal neutralization step. The development of this new type of bleach plant was started several years ago. At that time Becco had already developed the chemical aspects of the cold steep system, and a unit was in operation in conjunction with a feltless wet machine. It was necessary, however, to work out the mechanical details for this new method of producing the high density pulp, mixing the pulp and bleach liquor, and handling the resulting mixture with due allowance for the necessary storage time, shipment, etc. At the present time the resulting system has been in almost continuous semi-commercial operation (15 tons per day) for more than one year, and additional equipment has recently been installed which brings the capacity of the unit to 30 tons per day.

Alkalinity controlled

In the Becco cold steep system the alkalinity of the bleach liquor is carefully controlled so that upon completion of the bleaching the pulp will be neutral or slightly acidic and therefore will not require neutralization. In order to accomplish this end the bleach liquor must be of such a nature that comparatively long bleaching periods are required. At normal temperatures, several days are required before bleaching is complete. The pulp will then be neutral or slightly acidic and ready for papermaking without any neutralization or treatment other than normal stock preparation. The pulp is stable enough, however, so that it can be stored for several months before use.

The screened stock is first thickened from 0.4 per cent to about 6.0 per cent consistency on two direct flow deckers



Flow diagram of the groundwood bleaching process developed in cooperation with Jackson & Church and Buffalo Electro-Chemical.

(cylinder 108 inches long by 36 inches in diameter). This stock drops to a small chest located over an Allis-Chalmers 16 by 6 stock pump, which is driven by a 30 hp Allis-Chalmers motor through an Allis-Chalmers Texrope drive. This pump has handled 7 per cent stock without difficulty.

Presses

The stock is pumped to two intermediate size Jackson & Church Zenith presses. The stock enters these presses at the top and is pushed downward by the rotation of the interrupted flights on the spindle, which resemble segments of screw conveyor flights. The core of the spindle is larger at the bottom of the press than at the top, and thus as the pulp progresses downward the water is squeezed out of it through the perforated screen plates around the press and on the core of the spindle itself. The pulp seals at the bottom of the presses are maintained through the action of sealing cones which are activated by pneumatic pistons. This feature makes the presses operable over fairly broad ranges of capacity.

The pulp leaving the presses (about 35 per cent oven dry) is carried by means of screw conveyors to a metering box with an adjustable gate at one ned. The pulp crumbs are carried by the conveyor belt which constitutes the floor of this box through the adjustable metering gate to the inlet of the Jackson & Church 015 high density mixer. The bleach liquor is also fed into this high density mixer, and the pulp leaving the mixer is evenly impregnated with bleach liquor.

In the Becco cold steep system the sodium silicate used for stabilizing the bleach liquor furnishes sufficient alkali to activate the hydrogen peroxide for groundwood bleaching. It is not necessary to add the epsom salts normally used, and therefore all of the ingredients of the liquor are liquids which are easily handled and measured. The liquor is mixed in batches. Sodium silicate (41° Baumé, ratio 1:3.22) and 50 per cent hydrogen peroxide are pumped into calibrated tanks. They are measured from these tanks into a larger tank where they are mixed with water in proper quantities to give about 1.3 per cent of 50 per cent hydrogen peroxide and 4.5 per cent sodium silicate when 150 gallons of bleach liquor are used per ton of pulp (dry basis). Agitation in the mixing tank is

Background and personalities

Little Rapids Pulp Co. is a small mill located on the Fox River between Green Bay and Appleton. The original mill was built in 1909 by Luther Lindauer of Kaukauna, and it has always specialized in the manufacture of groundwood pulp. The firm, a Wisconsin corporation, now operates both the Little Rapids mill and Shawano Paper Mills, Shawano, manufacturers of wrapping tissue, waxing and other bleached light weight specialties, both MG and MF. The main office of the company (including both Little Rapids and Shawano) is at Green Bay.

Charles N. Egan is chairman of the board and president of this company and has been active in the company since 1947. He graduated from Yale Engineering School in 1933 and has been in the paper industry since that time. He spent six year with The Mead Corp.; six years with Hennepin Paper Co., Little Falls, Minn., where he was general manager.

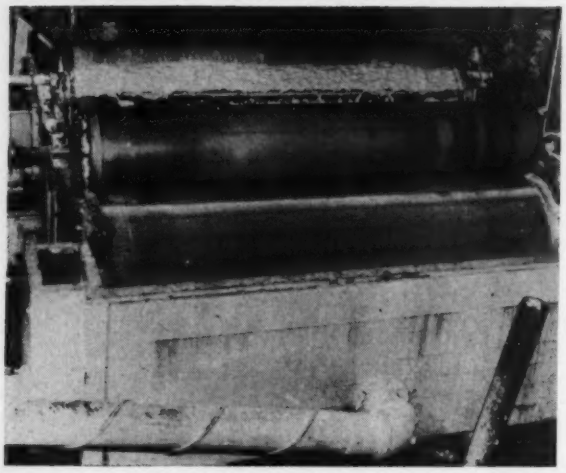
Resident manager at Little Rapids is Robert L. Leaf Jr. who received his Ph.B. from the University of Wisconsin in 1945 and his M.S. from the Institute of Paper Chemistry in 1949. Mr. Leaf's experience includes research work at the Institute; the positions of development chemist and later general foreman of the mill finishing department at Ohio Box Board Co., and technical director at Shawano Paper Mills.

James E. Miller is general superintendent. He came to Wisconsin from Illinois in 1914 and started work as a roll skinner with Little Rapids in 1918. He has been with the mill since that time, becoming head millwright in 1937 and general superintendent in 1947.

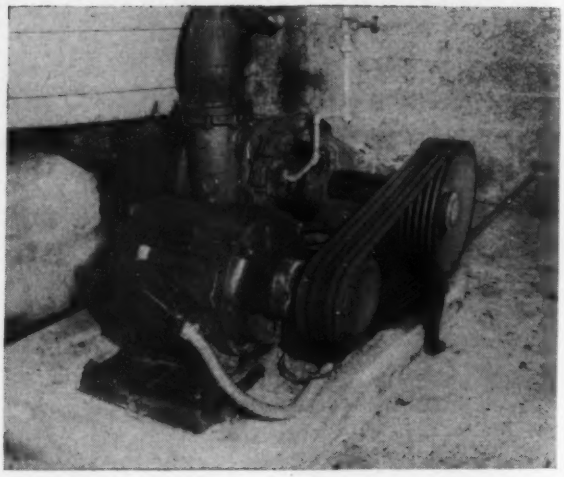
Charles N. Egan
President

Robert L. Leaf Jr.
Resident Manager

James E. Miller
Gen. Supt.

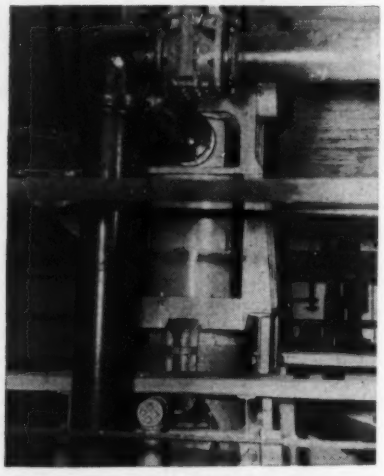


Conventional groundwood deckers thicken screen stock from 0.4 to 6 per cent

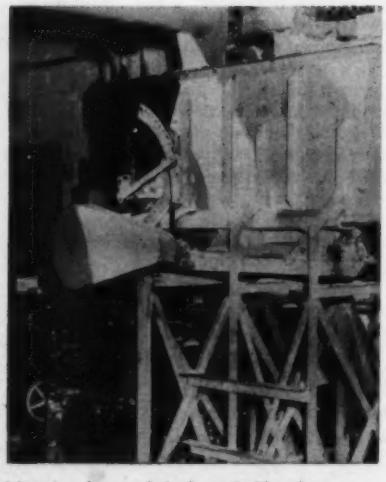


Allis-Chalmers stock pump, which can handle 7 per cent stock

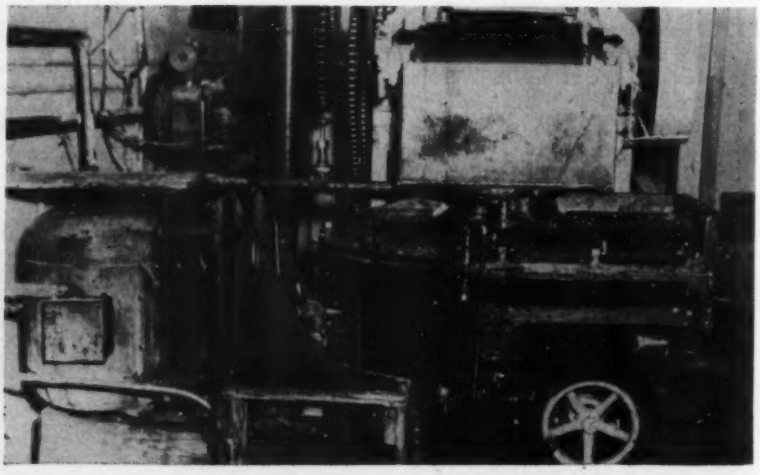
General View of No. 1 (right) and No. 2 (left) Jackson & Church Zenith presses



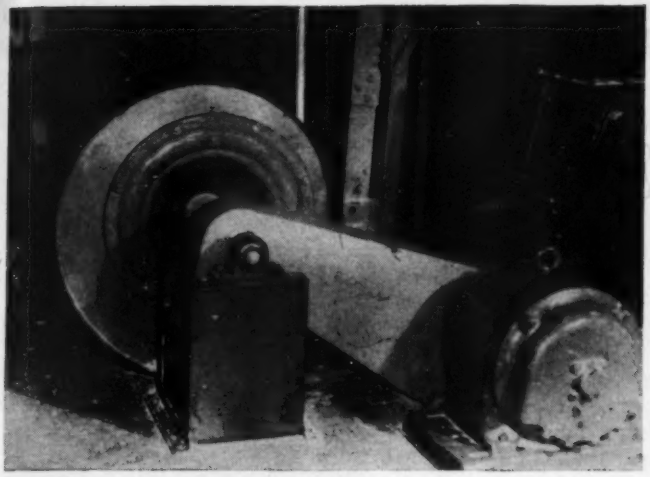
Close-up of Jackson & Church Zenith press



Metering box and Jackson & Church 015 high density mixer



Close-up of Jackson & Church 015 high density mixer



Clarage blower for transporting pulp to railroad car for shipment

Flow of bleach liquor through Fischer & Porter Rotameter is adjusted by John Lemmen

Bleaching unit shortly after installation is inspected by Norbert Jannsen and Edward Erdman

Sample of bleached groundwood pulp is taken by Leon Jansen

provided by a mixer which was furnished by Mixing Equipment Co. Bleach liquor is pumped from a standby tank during the time that liquor is being mixed in the main tank.

The bleach liquor is metered into the Jackson & Church 015 mixer through a Fischer & Porter Rotameter. Flow of the bleach liquor has been controlled by an ordinary needle valve, but a Kates direct acting flow regulator is now being installed.

Blower installation

One of the major problems encountered in developing this process was the means to be followed in handling this pulp after it had been mixed with the bleach liquor. This problem was solved through the installation of a pneumatic system which was supplied by Holly Pneumatic Systems, Inc. The pulp is blown by the Clarage blower directly from the J & C 015 mixer to the railroad car for shipment to the consuming mill.

Shipment by rail, even for short distances, allows ample time for the completion of the bleaching cycle. The pulp upon arrival at the customer's mill has a brightness of 70-72 compared to a normal unbleached brightness of 58-60.

The Little Rapids mill has a siding on the Chicago & Northwestern Rwy. The railroad operates a freight depot at Little Rapids. The wood used in the operation comes in by rail from Wisconsin, Upper Michigan, and Minnesota.

There are eight three-pocket grinders at the mill. Seven of these are driven by pairs of 150 hp, 62-inch Samson vertical hydraulic turbines which were manufactured by James Leffel & Co., Springfield, Ohio. The eighth grinder is driven by a 500 hp Allis-Chalmers synchronous motor. The Norton stones used in the grinders range from 27 to 32 inches wide and 50½ to 54 inches diameter.

After preliminary treatment on sliver screens, the stock from the grinders goes over an ordinary riffler and then to a No. 2 Impco knotter. The primary screening is done on two No. 3 Impco centrifugal screens. Secondary screening of the rejects from these screens is carried out on two flat screens.

A certain portion of the mill's production is shipped as unbleached pulp in wet lap form. This pulp is lapped on the three 84-inch Appleton wet machines. The balance of the wet machines have been removed to provide space for the bleaching unit and pneumatic handling for the bleached pulp.

The availability of bleached groundwood makes it possible for the papermaker to make a bright paper at a lower cost than previously or to make a paper with an improved brightness without substantially increasing the furnish cost. It also permits him to take advantage of the desirable characteristics of groundwood, such as printability, softness, or cost, in grades of paper where this was not previously possible because of the color of the unbleached groundwood pulp.

Paper and paperboard making—XXI

HARRY WILLIAMSON

Continuing excerpts from the author's forthcoming book covering all phases of paper and board manufacture. Dealing with the fourdrinier machine and its complexities, these installments will appear serially in THE PAPER INDUSTRY. The first—on fundamental principles—will be followed by discussions of such subjects as formation factors, slice velocity, consistency, alignment of fibers in flow, the wire mesh, and others. The current series concludes the presentation of excerpts. Parts I through XX appeared from March 1950 to December 1951 and discussed hydration, the cylinder machine, and beating. Mr. Williamson's book is to be published by Fritz Publications, Inc.

Harry Williamson —author of Paper and Paperboard Making

Fourdrinier Machine Fundamental Principles

Supply

The continuous supply of a mixed volume of water and fiber is delivered to the formation area of the paper machine. The *volume* is total gallons per second, to be synchronized in continuous flow to the requirements of the formation area. The *proportions* of the mixed volume are the ratio of fiber content to water content, to be a CONSTANT for any given ream weight of paper made at a given machine speed run, and to be readily adjustable, each to the other, for any given ream weight to be made at the desired machine speed to be run. The *delivery* of this mixed volume to the formation area, regardless of ream weight of paper of speed of the machine, is to be *effected* in such a manner that the fiber content will be dispersed as individual fibers throughout the carrying medium, water, and EVENLY DISTRIBUTED over the *total* formation area in conformance to the continuous requirements of the formation area. The whole of this *supply* of mixed volume to the formation area is to be accomplished with least possible entrainment of air in either water or fiber.

Formation

The formation of ANY sheet of paper, regardless of the *type* of paper machine on which it is formed, is *affected* by:

(a) the use of a woven wire mesh—various degrees of gauge of wire used, and fineness of weave according to the grade of paper to be made—as the FORMATION UNIT.

(b) The *even distribution* of the mixed volume of water and fiber to and over the surface area of the formation unit.

(c) The *drainage* of the water *through* the *mesh* of the woven wire of the formation unit, leaving the fibers interlocked and interwoven with each other as a continuous and homogeneous sheet, on the *surface* of the formation unit.

The TIME RATE of this formation in process is *affected* by:

(a) Fiber conditions, such as the species and total physical dimensions of the fibers used; the *amount* of *reduction* of the parent fibers; the creation of fibrils, fibrillae, and microscopically fine particles of fiber; the development of the colloidal properties of hydration in and on the fibers, and loading materials used in conjunction with the fibers.

(b) Mechanical conditions, such as the *fineness* of the wires from which the mesh is woven; the closeness of the weave or number of mesh per square inch of woven wire; the effect on drainage of water through the mesh by the sideways action of the shake device imparted to the formation area; the capillary force created by the contact of the revolving tube's or table rolls in direct contact with and supporting the traveling formation unit—the woven wire mesh. (Note: 'shake device' and 'tube rolls' are on a fourdrinier formation *only*.)

(c) Water conditions, such as temperature in relation to fluidity, surface tension and responsiveness to capillary flow; purity in relation to semi-solid content of fine particle-size fiber and loading materials (white water).

Surplus water removal

Having completed the *function* of *carrying* the fibers until they are formed into a homogeneous and

continuous sheet by the action of water drainage through a woven wire mesh, the surplus water—that water which DID NOT drain through the wire mesh, *must* be removed without disturbance or undue impress-marking of the fibers comprising the newly formed sheet. The removal of surplus water is *effected* by two means:

(a) By the application of *atmospheric* pressure on the surface of the sheet. This is effected by the creation of a vacuum or partial vacuum in stationary flat boxes and a revolving suction couch roll, over and around which the endless formation unit—the wire carrying the newly formed sheet—travels.

(b) By the application of *mechanical* pressure. This is effected by the use of successive pairs of revolving press rolls. Each pair—a top and bottom roll —forms a nip contact through which the newly formed sheet of paper is carried by means of an endless woolen blanket—known in the trade as felts. In addition to the actual weight of the top press roll, further application of adjustable pressure weight is available, either by means of weighted levers or hydraulic diaphragm transmission.

These are the fundamental principles of making paper on a fourdrinier paper machine. They have NOT changed basically since the invention of the *first* fourdrinier machine for producing a continuous sheet as a replacement of the individual hand sheets of paper. Ingenious mechanical and hydraulic devices have been evolved, and more accurate 'engineering' to enable us to use very much wider and faster running paper machines is a natural result of our modern increasing tempo of mechanical "know how."

However, the FUNDAMENTAL PRINCIPLES of making a continuous sheet of paper have NOT changed since the *first* continuous sheet of paper was made.

With this basic premise in mind, and a life span of not more than 75 years to cover, we can note the important mechanical changes in the fourdrinier machine which have enabled us to reach the width of sheet and the linear foot speed per minute at which the modern fourdrinier produces a continuous sheet of paper.

It is not necessary to think of 1,800 years, nor even 130 years. In the past 75 years the fourdrinier machine has not only grown up, it has reached maturity. If we want to run MUCH faster than present day speeds, then we shall have to consider *radical* changes in the *design* of the *formation unit.*

In this connection it may be asumed that WATER will ALWAYS be the carrying medium of the fibers to be formed into a sheet of paper. It may also be assumed that a proportionate volume and ratio of fiber to water, the use of capillary forces, and the use of created and regulated applications of vacuum will ALWAYS be the fundamental elements used in the formation of a continuous sheet of paper. It will be in the CONTROL, METHOD, and PROPORTION of the application of these basic forces that, embodied in design, will enable the manufacturer of paper to make still further progress in speed of production and increased uniformity of the desired qualities of the product.

Using the past and the present as the basic study may lead some reader of these writings to the *design of the future.*

Comparison of Formation TIME Relative To Machine Wire Length

Formation Length of wire equals 28.5% of total wire length.

$$\frac{\text{Formation Length in Feet.}}{\text{Machine speed; Ft./Min.}} \times 60 \text{ equals} \text{ ——— "SECONDS FORMATION TIME"}$$

	Total Wire Length.					
	54′	64′	70′	80′	84′	115′
Formation Length:	15.4′	18.25′	19.95′	22.8′	23.94′	32.8′
Machine Speed Feet per Min.	Seconds Time for Formation.					
10 fpm	92.4	109.5	119.7	136.8	143.64	196.8
50 fpm	18.5	21.9	25.94	.....	.....	.....
100 fpm	9.24	10.95	11.97	.....	.....	.....
120 fpm	7.7	9.125	9.98	.....	.....	.....
150 fpm	6.1	7.3	7.98	.....	.....	.....
200 fpm	4.6	5.475	5.95	.....	.....	.....
300 fpm	3.08	3.65	3.99	.....	.....	.....
400 fpm	2.31	2.737	2.992	.....	.....	.....
500 fpm	1.848	2.19	2.394	2.736	2.873	.....
600 fpm	1.54	1.825	1.996	2.28	2.394	.....
700 fpm	1.32	1.564	1.71	1.954	2.052	.....
800 fpm	.....	1.369	1.496	1.71	1.796	2.46
900 fpm	.....	.....	1.33	1.52	1.596	2.18
1000 fpm	.....	.....	.....	1.368	1.436	1.968
1100 fpm	.....	.....	.....	.....	1.306	1.79
1200 fpm	.....	.....	.....	.....	.....	1.64
1300 fpm	.....	.....	.....	.....	.....	1.57
1400 fpm	.....	.....	.....	.....	.....	1.41
1500 fpm	.....	.....	.....	.....	.....	1.312
1500 fpm	0.616	0.73	0.798	0.912	0.9576	1.312

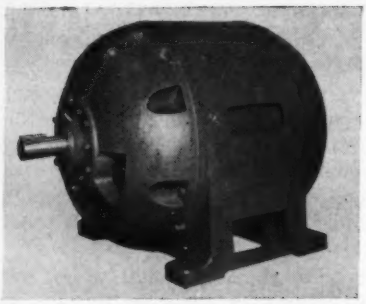


Fig. 1—Typical general purpose squirrel cage motor using ball bearings and having a drip-proof frame construction

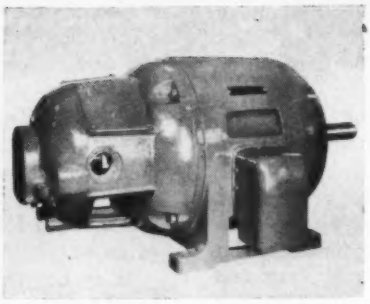


Fig. 2—Provision is made in slip-ring or wound rotor motors for access to the brushes on the slip-rings

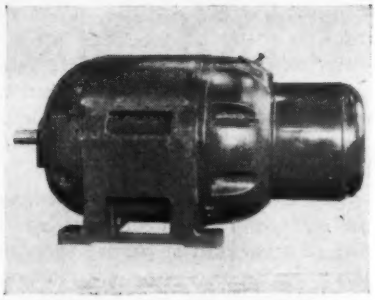


Fig. 3—Typical bracket bearing synchronous motor with exciter mounted on the outboard bracket

Centrifugal Pumps

Part 21 of a series

Selection of electric motors for centrifugal pump drives

IGOR J. KARASSIK and ROY CARTER

Application Engineers
*Worthington Corporation

THE MOTOR USED for most centrifugal pump applications is the horizontal type with open frame, utilizing suitable insulation and electrical design. Generally, ball or sleeve bearings supported by brackets attached to both sides of the frame are used, with the exception of larger synchronous motors, which are often made with pedestal-type sleeve bearings. Where this regular type of motor construction is not suitable, more applicable designs or modifications can be obtained and should necessarily be used where conditions warrant.

Vertical motors are obtainable with various forms of mountings. They are made both in the solid and hollow shaft types, the latter being used almost exclusively on deep-well turbine pump and vertical-propeller pump applications. Both shaft types are made so they can carry external thrust loads. Vertical motors require thrust bearings which are usually anti-frictional in small and medium sizes and Kingsbury or similar type in large sizes.

In many applications the open frame motor is not suitable, and a special enclosure is necessary. The frame designs and modifications quite commonly needed are drip-proof, splash-proof, and totally-enclosed, self-ventilated or fan-cooled.

A drip-proof motor is designed so that dripping liquids will not get into the windings. Some manufacturers have made their regular open, general purpose designs so they are drip-proof (Fig. 1). Drip-proof motors have a temperature rise rating of 40C. or 50C. depending on the design.

A splash-proof motor is one designed so neither dripping nor splashing liquids will get into the windings (Fig. 5). As ventilation is restricted, splash-proof motors are regularly rated at 50C. rise, but 40C. rise motors are also obtainable.

Totally-enclosed motors

Various types of totally-enclosed motors are made. They are classified first as to the type of cooling and second as to the design of enclosure for the application. Totally-enclosed non-ventilated motors are feasible in small horsepower ratings, but larger horsepowers have to have fans incorporated in the design to provide adequate cooling. Both types are rated at 55C. rise. In addition, totally enclosed separately ventilated motors arranged to use air from an outside source for cooling are obtainable. The self- or pipe-ventilated type has a fan built into the motor to circulate air, while the separately or forced ventilated type depends on a separate forced air supply for ventilation. The temperature rise rating of these outside ventilated motors is 40C. under proper conditions. Totally enclosed motors are used in locations where the surrounding air contains dust, corrosive vapors or inflammable gas or vapor. The design of the enclosure required varies with the application. (Explosion-proof electrical equipment covers a design made so that if an explosion occurs within the equipment it will not cause damage or go beyond the interior.) The problem presented to the motor designer varies with the character of the hazard; the National Electric Code has designated hazardous gas locations as Class I with four groups (A, B, C and D) and hazardous dust locations as Class II with three groups (E, F and G). These groups cover atmospheres containing:

Class I—Group A—acetylene
Group B—hydrogen or gases or vapors of equivalent hazard
Group C—ethyl ether vapor
Group D—acetone, flammable alcohols, gasoline, naptha, common petroleum distillated pyroxylin-lacquer solvents toluene and natural gas

Class II—Group E—metal dust
Group F—coal or coke dust
Group G—grain dust

Motors used in gaseous coal mines have to be constructed and installed to meet the rules of the U.S. Bureau of Mines, not the National Electric Code.

Material from this article will be included in a book on centrifugal pumps now being prepared by the authors; hence, all rights to republication are reserved by the authors.

*Formerly Worthington Pump & Machinery Corporation.

It is important in ordering motors for hazardous conditions to specify clearly the hazard involved, so that a motor of suitable design for the hazard is obtained.

In some hot, humid, dusty or corrosive atmospheres, open, splash-proof or drip-proof motors with special insulation can be used. The insulation regularly used on standard motors is suitable for a moderate amount of moisture, weak acids, alkalies, abrasive but not conducting dust, oil, or other similar materials. For more severe conditions, more resistant types of insulation are available; for example, in power plant boiler rooms a combination of conducting or abrasive dust with sulphur fumes is often encountered, and a suitable type of insulation can be obtained for these conditions.

Motors used in the tropics require special protection against fungus, vermin, and excessive moisture or heat, or both. Thus, motor manufacturers recommend tropical protection for motors to be used in the tropics and for such motors provide special insulation, screens over all openings, and special treatment of insulation and metal surfaces against fungus, insects and corrosion.

Dampness, infrequent use

Motors which will be installed in damp locations on machines which will not be used frequently can become damp, especially in cold weather, with resulting damage to the motors. Larger motors under these conditions are often protected by installing electric space heater elements which are turned on when the motor is not in operation, thus keeping the motor warm and, as a result, dry.

The average motor develops some noise in running, mostly due to the fan circulating the air for cooling. In some locations (hotels, office buildings, etc.) the amount of noise developed with a regular motor design is objectionable, and special motor designs, which produce a minimum of noise, should be used. Such motors are known as quiet operating motors.

Heat generation

The electrical losses in a motor go into heat, which must be dissipated to the surrounding atmosphere or to the cooling air. The amount of heat generated is dependent on the load, and the actual temperature of the motor is dependent on the load and the surrounding cooling air temperature, while the safe operating temperature of the motor depends on the insulation used in its manufacture. With Class A insulation, the over-all motor temperature must not exceed 95C. (203F.), while with Class B insulation the over-all motor temperature can safely be 125C.

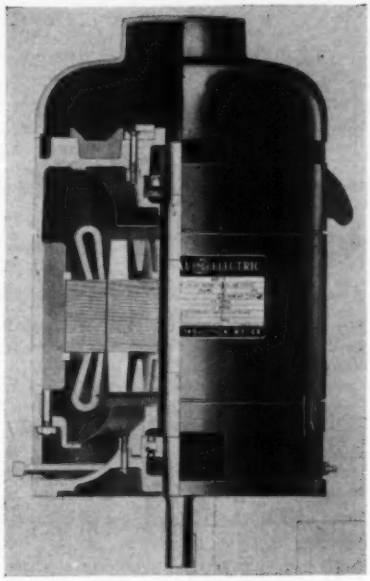


Fig. 4—Vertical motors have to be provided with thrust bearings; this design employs ball bearings

(257F.). It is therefore obvious that the lower the surrounding air or ambient temperature, the greater the temperature rise that can be permitted in the motor; and, as the temperature rise in the motor is proportional to the load, the greater the load that can be carried by the motor within the safe operating temperature limit. On the other hand, if the surrounding air temperature is high, the maximum load that the motor can safely carry will be lower.

Motor rating

Motors are rated on their maximum temperature rise above an assumed ambient surrounding air temperature of 40C. (104F.) when carrying rated load. Most open motors are 40C. rise motors—meaning that, with an ambient surrounding cooling air temperature of 40C., the temperature rise of the motor when operating at full load will not exceed 40C. Under such conditions the actual temperature of the motor might be 176F., much too hot to be touched but considerably lower than the safe operating temperature of the motor. Regular 40C. rise motors are designed with a service factor of 1.15, meaning that the motors can carry 115 per cent of their rated loads continuously without the temperature rise in any part of the motor exceeding a safe operating temperature, providing the air temperature is 40C. or less. With 40C. rise motors it is therefore safe to load them above their nameplate rating but under no condition above 115 per cent of their rating. This ability to carry up to 15 per cent overload with safety often permits the use of a motor whose rating is less than the required maximum load with a saving in cost. As a rule with centrifugal pump drives, it is desired to have ample driver power in case the pump, when built, develops excess head or capacity, or in case adverse operating conditions (like low voltage, high cooling air temperature, or others) should be encountered. It is therefore usual practice only to plan on utilizing the margin provided by the service factor for occasional maximum conditions or on units which will operate infrequently for short periods. Naturally under this last condition the motor is cold when started and will be in operation for some time before it reaches its maximum operating temperature. Motors rated at 50C. and 55C. rise are not designed with a service factor and should be selected so they are not overloaded under any condition.

Cooling medium

The usual cooling medium for motors is the surrounding air. If this is rarefied, as it is at higher altitudes, it is a poorer cooling medium. Standard motors are designed for air densities that will be encountered from sea level to 3,300 feet above sea level. For applications above 3,300 feet the safe loading of the motor is reduced. Motors designed for high altitudes can be obtained at additional cost.

Electric motors are made for standard voltages depending on their sizes; for example, 30 hp 1800 rpm 3-phase, 60 cycle motors are regularly offered for 208, 220, 440 and 550 volts. A motor can be operated successfully, but not necessarily in accordance with standard guarantees, at voltages 10 per cent above or below its nameplate voltage (at maintained frequency in case of alternating current motors). Motors wound for special voltage can be obtained at additional cost.

In some few alternating current installations, the frequency of the power supply varies. This causes a variation in the operating speed, with a resulting variation in the operating characteristics of the pump. In such cases the maximum loading on the motor under the most adverse conditions must be checked carefully to insure safe operation. It is usual for standard motors to be designed so they can operate satisfactorily at frequencies 5 per cent above or below rated. Varying the frequency of the current supply in order to vary the motor speed and thus the characteristics of the pump has been used in a number of water works installations where variable pump output is required.

Some alternating current motors are wound so they can be used on either of two voltages depending on how the leads are connected; for example, 220 or 440 volts. This construction is used as standard for some sizes and combinations of voltages. The ratio of voltages

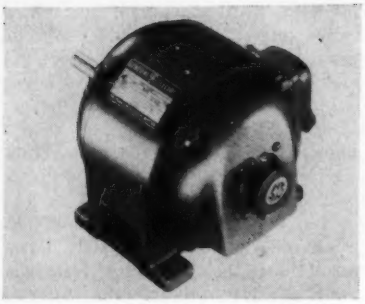


Fig. 5—In splash-proof type, cooling air is drawn into and discharged through bottom openings in end bells

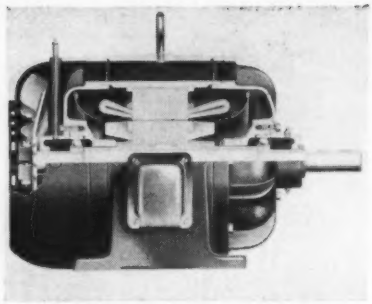


Fig. 6—In totally-enclosed type, fan cooled, fan-blown air cools the exterior of the motor proper

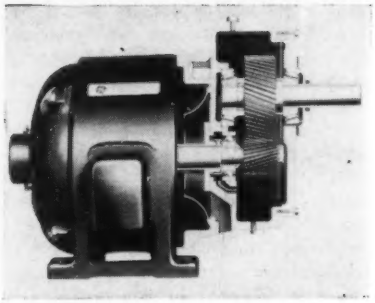


Fig. 7—Low speed in a gear head motor is provided by means of a combination of a motor and a gear

is necessarily to certain fixed values. Motors so made are called dual voltage motors.

Increased efficiency

By making a special design and using special materials with resulting increased cost, induction motors over 200 hp and synchronous motors can generally be made so that somewhat better efficiency is obtained. With units that are to be operated more or less constantly, the saving in power costs will, in many cases, warrant the increased first costs of premium efficiency motors.

In the smaller hp sizes, gear-head motors (Fig. 7) (which are, for 60 cycle current, generally 1800 rpm motors with a built-in gear transmission) are regularly listed products for many motor manufacturers. This type of motor drive does not find much application for centrifugal pumps except occasionally on low head units.

In addition to the above-mentioned major electrical and mechanical variations in motor design, there are additional variations obtainable, such as double extended shaft for driving from both ends of the motor, split end shields, and many others. In any case in which a regular design of motor is not fully suitable either electrically or mechanically for the application, a check should be made with the electrical manufacturer to see if a better design for the application can be obtained.

Starters for electric motors

A starter for an electric motor serves the function of connecting the motor electrically to the source of supply. The necessary mechanical movement of the contactors can be accomplished manually or automatically. Those in which this is done manually are called manual starters, while those in which it is done automatically by means of magnets, on receiving an impulse from a pilot device, are called automatic or magnetic starters.

A starter for a direct current motor could be a knife switch, but this would impose full voltage across the motor terminals with a high current inrush. While this is possible for small motors, it is generally desirable to have an adjustable resistance, a rheostat, connected in series with the motor armature to limit the initial current. As the motor accelerates, the resistance is cut out until full voltage is applied to the armature and the motor is running at full speed. If this resistance is used solely for starting, it is called a starting rheostat. When it is desirable to be able to run the motor at a reduced speed by having some of the resistance in the armature circuit, the rheostat must be designed so the energy used up in the resistance to form heat can be dissipated; the rheostat is thus more expensive.

Starters for single phase alternating current motors are usually some form of an across-the-line starter. Where this type cannot be used because of the limited line capacity, a device, functioning to reduce the voltage initially applied to the motor terminal and to increase it in steps until full voltage is reached, is used.

Starters for polyphase squirrel cage motors are made in three types: across-the-line, compensator or auto-transformer, and resistance, the first two being commoner. The across-the-line, or full voltage, starter, as its name implies, applies full voltage to the motor terminals, resulting in a high starting current dependent on the basic design of the motor. With a small line or a limited generator capacity, this will result in a voltage drop which is generally objectionable. In case a full voltage starter cannot be used, a reduced voltage starter using a compensator or auto-transformer is usually employed. Such a starter is basically a transformer wound so that a reduced voltage (generally 80 per cent of the line voltage) can be initially applied to the motor terminals. When the motor has reached part speed, the transformer is cut out and full voltage applied to the motor terminals. This type of starter limits the starting current about in proportion to the square of the applied voltage. For example, a motor having a starting current 5.5 times its full load current would, with an auto-transformer starter giving 80 per cent voltage, have a starting current of $5.5 \times (.8)^2$, or 3.52 times full load current.

Compensator types

Compensator type starters are usually made with two taps so the starting voltage can be 80 or 65 per cent of rated voltage. The lower the reduced voltage initially applied, the lower will be the initial current inrush, but the current inrush when full voltage is applied will be increased. In using a lower reduced voltage in starting, the starting torque is further reduced, and the motor cannot attain as high a speed before it is necessary to apply full voltage.

Special three-step starters and resistance type starters can be obtained and are used in some special cases. They are more expensive, and their use is naturally limited to cases where the starting current must be further limited.

Starters for wound rotor or slip ring motors have a primary switch and resistance for the three leads of the wound rotor. In starting, full voltage is applied to the stator with the maximum resistance cut in the wound rotor circuit. As the motor speeds up, the resistance in the wound rotor legs is cut out until, when all resistance is cut out, the motor is running at full speed. The wound rotor motor can, with proper choice of resistance and steps, be started with little increased current demand and is therefore a valuable type when the power supply is limited. The resistance used in the wound rotor circuit can be obtained either for starting duty or for both starting and speed regulating duty.

Starters for synchronous motors are basically the same as those used for squirrel cage motors except with the addition of a mechanism to apply the direct current to the motor field circuit when the motor is being synchronized.

Protective devices

Except for the action of protective devices built into some manual starters, the starting and stopping of a motor controlled by such a starter is done manually. With an automatic starter,

the starting and stopping can be accomplished by some pilot device or manually by a push button station. Such pilot devices can either be of the instantaneous or maintained contact type. The protective devices generally incorporated in electric starters are for overload and undervoltage.

Protection against damage from overload is regularly accomplished by some heating device incorporated in the starter so a sustained current in excess of rated will cause the contactors to trip out. When this occurs the mechanism has to be re-set manually before the contacts can be re-engaged.

After being started, a three-phase squirrel cage motor will continue to run on one phase if the other two phases are disconnected. If the same load is carried on the motor, the current with such single-phase operation will be greatly increased, with a resulting damage to the motor if a normal load is being carried. There have been many cases where this has occurred with motors that were not controlled by starters having overload protection, with the result that the motors burned out. It can be generally recommended that some form of overload protection should be incorporated in any motor installation.

Low voltage

To protect the motor against low voltage, two methods are employed. One is called undervoltage protection and is used with momentary contact pilot devices. In case of undervoltage, the holding coil in the control releases, and the contactors are opened. Resumption of full voltage will not cause the contactors to re-engage, as the opening of the contactors has opened the circuit of the holding coil. The other form is called undervoltage release and is used with maintained contact pilot devices. In this form, undervoltage causes the holding coil to release the contactors, which open, and stops the motor but does not open the control circuit. Thus, when the voltage is re-established, the control will again close the motor line contactors and the motor will again start. In some applications, low voltage release is dangerous, and undervoltage protection should be used. If the pilot device is a maintained contact type, undervoltage protection can be used by introducing proper relays into the control circuit.

In addition to providing overload and undervoltage protection for the motor, the electrical installation should provide protection against a possible short circuit. High voltage (2300 volts and higher) controllers are usually made with an interrupting capacity 10 times the rated motor current; however, most high voltage circuits can produce short circuit currents far in excess of this value. For interest of safety both to the personnel and the property, it is desirable to provide equipment which will provide adequate protection in case of a short circuit.

Factors involved in wood pulp production—Part II

Conclusion of a thorough discussion by Dr. Maass of some of the underlying factors involved in the process for wood pulp production, in which the author reviews work carried out under his direction at the Institute. The first part—which appeared in July—dealt with natural and forced penetration, penetration of lignins, penetration of gases, natural penetration studies, chip size, nature and distribution of lignin.

DR. OTTO MAASS*
General Director
Pulp and Paper Research Institute of Canada

SULPHITE COOKING LIQUOR consists of a solution of a base, generally calcium oxide, in sulphurous acid with the latter in excess. A normal commercial cook has, in the vernacular of the sulphite chemist, from 1 to 1.5 per cent of combined sulphur dioxide and from 4 to 6 per cent of free uncombined sulphur dioxide. The wood, in the form of chips, is submerged in this liquor in a digester which may be 60 feet high and 18 feet in diameter and produces 20 tons of pulp. The cooking temperature reaches 140C. Until circulation of hot liquor became general practice some 15 years ago, the initial rise in temperature was slow, especially in the neighborhood of 110C. in order to ensure adequate penetration and sulphonation. The cook is considered complete when the lignin content of the pulp has been reduced to the desired amount. Cooks took as long as 12 hours, but this has now been considerably reduced by the introduction and circulation of hot liquor. Even now, the tendency on the part of the operator is to slow up the initial temperature rise to prevent the burning of chips.

Cooking procedure has been based on the results of practical experience. The

*Paper presented by Dr. Maass upon receipt of the 1952 Chemical Institute of Canada palladium medal donated by International Nickel Co.

The following investigators collaborated with Dr. Maass in the work outlined in the address: W. B. Beazley, J. M. Calhoun, W. B. Campbell, J. J. R. Cannon, A. J. Corey, R. de Montigny, E. Filby, P. E. Gishler, N. H. Grace, A. D. Grieve, G. W. Gurd, H. W. Johnston, G. L. Larocque, Carol E. Maass, L. S. Macklin, O. M. Morgan, L. M. Pidgeon, R. Richardson, H. H. Saunderson, J. H. Sutherland, and F. H. Yorston.

period in which it was deemed necessary to bring up the temperature gradually to the final 140C. ensures that no burning of the chips occurs. Without this period, although the outside of the chips at the end of the cook will be light colored, well cooked and easily defibered, the centers may be dark and hard. These are called burnt chips.

Burning of chips due to faulty penetration

It has been the fashion in the past, by some, to attribute troubles like this to various causes such as sulphonation rates and acid formation, although this type of burning takes place at the beginning of the cook and, when it does, is largely due to faulty penetration. Proof of this was given by subjecting wood chips in the experimental digester to pre-evacuation, after which no burning occurred even when the temperature was raised immediately to cooking temperature. That this was the real cause, and not due to some other conditions in the experimental digester, was shown by carrying out comparative runs with identical conditions, except that in some no pre-evacuation was carried out, in which case typical burning of chips occurred. Furthermore, runs were carried out using different pre-evacuation pressures. With wood of low density, 0.36, a critical pressure of a tenth of an atmosphere was found. That is, when air pressure in the digester was not reduced below this critical pressure, burning of chips took place. With high density wood, 0.52, the change from a non-burning to a burning condition was more gradual. These observations are not so surprising in view of the experiments on forced penetration, with the two-phase liquid-gas system which has been described. Even though the pressure in the digester increases with rise in temperature, the vapor pressure of the sulphur dioxide in the air bubbles in the wood increases and the bubbles do not diminish in size. The thorough impregnation of the wood material then has to take place by diffusion of reagents past these bubbles through the wood material. This accounts for the need of a long penetration period under practical commercial conditions.

Reactions with Lignin

Another factor enters into this problem as far as natural penetration of sulphite liquor is concerned. Experiments carried out with natural penetration of sulphite liquor showed conclusively that the uncombined sulphur dioxide in the solution diffuses more rapidly than the combined. It has long been known that free sulphur dioxide in the absence of base will cause lignin to polymerize to a dark-colored insoluble substance at elevated temperatures.

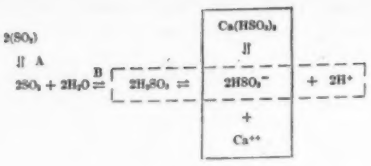


Figure 7

Reactions with lignin that occur when sulphite liquor is brought into wood have been the subject of much thought. Remarkable contributions have been made by organic chemists in elucidating the chemical nature and structure of this complicated organic compound. Reference must be given to the fine work of the late Dr. Harold Hibbert and to that of his successor at the Institute, Dr. Clifford Purves, and to Professor Hägglund of Sweden, that great contributor to all phases of wood chemistry, whose text-book on the subject is the wood chemist's bible. For the purposes of this discourse let us look upon lignin as a phenolic compound which can readily be sulphonated. Sulphite liquor supplies the sulphurous acid, and the presence of the base provides the means to anchor the acid in the form of a lignosulphonic acid salt. This salt then hydrolyzes and the products formed are constituents of the residual liquor commonly called sulphite waste liquor. It has been variously stated that the rate at which this process takes place is dependent on the concentration of the hydrogen ion alone.

To establish the exactness of this as a preliminary to further investigations of the reaction mechanisms, a preliminary but thorough study of equilibria existing in sulphite liquor was carried out. Actually, there are three separate stages which have been investigated depending on whether $[H_2SO_3] < [CaO]$, or $[H_2SO_3] > [CaO]$ and $< [2CaO]$, or $[H_2SO_3] > [2CaO]$. The last of these corresponds to relative concentrations occurring in commercial cooking, and a schematic diagram of equilibria under these conditions is shown in Fig. 7.

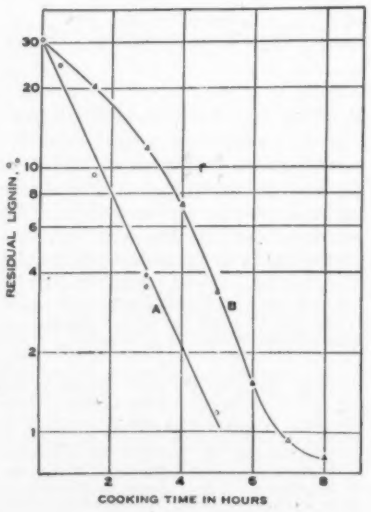


Figure 8

By measuring the electrical conductivity and the partial vapor pressure of sulphur dioxide in this system over a wide range of temperature and concentration, it was possible to calculate H^+ and HSO_3^- concentrations, including that range of concentration and temperature existing in the digester.

It was found that, starting with the equilibrium existing in the two-component system, $SO_2 - H_2O$, a considerable proportion of sulphur dioxide existed as such, the amount increasing with temperature, and that Ostwald dilution law constants, calculated for the dissociation of sulphurous acid into its ions, were constant at any temperature at which measurements were made, and showed no trend of change whatever over a wide concentration range.

In the absence of a base, the hydrogen ion concentration due to H_2SO_3 dissociation decreases rapidly with rise in temperature, for example, for a 5 per cent SO_2 solution from 0.109 at 25C. to 0.019 at 140C. The hydrogen ion concentration of a cooking liquor, 1 per cent combined SO_2, 6 per cent free SO_2, is surprisingly small: 0.0027 at 140C. The existing equilibria, calcium sulphite precipitation temperatures, etc., are of interest *per se* as a study of a three-component system investigated in great detail. Here it is sufficient to have indicated the basis on which these data have been determined and that the equilibria existing in the three-component system $CaO - SO_2 - H_2O$ are now well known.

Rate of delignification

It was shown conclusively that the rate of delignification is not dependent on the hydrogen ion concentration alone but is definitely also proportional to the bisulphite ion concentration. This can be restated that the rate is proportional to the product of the hydrogen ion and the bisulphite ion concentrations, which is in turn proportional to the concentration of the sulphurous acid present and not to the concentration of either ion separately. The addition of calcium monosulphite to cooking liquor affects the rate of delignification to only a small extent since the rate is almost independent of the concentration of combined sulphur dioxide at constant free sulphur dioxide. All this shows the importance of having established the actual equilibria mentioned before. The determination of the rates will now be described.

The rate of delignification of wood has been measured under controlled conditions and is found to correspond most closely to the formula representing a

monomolecular homogeneous chemical reaction, namely, that $\ln L_o/L = kt$, where L_o represents the original lignin present in the wood and L that present at time t. While this relationship does not represent the data with great precision within the accuracy of the observations, it does so more closely the more exactly conditions governing the concentration penetration factors are controlled. This may be approached more and more when diffusion of products formed out of the lignin, which is bound to affect it, are eliminated or, at any rate, accounted for. I am quite prepared, until this is proven (if ever), to call the rate of delignification a pseudo-monomolecular reaction and take the average value of k, calculated from each experimental observation, as the best means of yardsticking the rate of delignification for comparisons of rates for different cooks. Already described is other evidence that lignin in the wood has a probable physical structure corresponding to a swelling gel, and if its structure is open enough, most of it will be accessible for reaction. As a sample of the approach to linear relationship between ln 1/L and time, curve A in Fig. 8 depicts the results obtained in one of these rate experiments using wood in the form of finely divided sawdust.

Lignin undergoes physical change

There is another factor which may well affect the rate of delignification, namely some physical change taking place in lignin. Curve B represents the rate curve when the wood and the lignin in it have been subjected to a certain pretreatment, namely a six-hour period of heating in water prior to cooking. The lignin has undergone a marked change so that the rate of delignification is greatly decreased, and furthermore the rate no longer follows the pseudo-monomolecular reaction rate showing that the lignin is no longer in its over-all accessible condition. As pretreatment gave some most interesting results, the highlights of what was found will be outlined.

The extent of the effect of pretreatment was measured as follows: The amount of lignin left in a pretreated sample was compared with that of an untreated sample after both had been cooked under identical conditions. For example, after heating a sample of wood in water at 130C. for six hours before a three-hour cook, it contained 13.6 per cent lignin as compared with 3.5 per cent left in a sample of untreated wood cooked for the same time. It was found that the effect of pretreatment increased with length of time of pretreatment and with rise in temperature at which the pretreatment took place. In the absence of water, that is, if dry wood is preheated in nitrogen or in liquid toluene, no effect whatever is caused in the subsequent delignification even after a preheating of the wood for 24 hours at 130C. Heating wood in water gives rise to the formation of acid in the wood chip, and it was suspected that this might influence the results obtained. A chip was therefore preheated in the penetration clamp for six hours under a continual flow of distilled water being forced through, and it was found to cook at the same rate as untreated wood. Pure water then has no effect. With buffer solutions, a minimum effect was found to take place between pH 4 and pH 5. Pretreatment with salt solutions showed that the effect of the anions and of divalent cations was in the same order as the lyotropic series as given by Traube for the swelling of gelatin: CNS < I < Br < NO_3 < Cl < HPO_4 < SO_4, and Ba < Sr < Ca < Mg. It is evident that lignin undergoes a change which retards delignification, and this change furnishes additional proof of its gel character. The change, whatever its nature, must be reversible, for pretreatment for long periods at 140C. did not inhibit cooking but merely retarded the process. It has nothing in common with burning of chips which cannot be delignified.

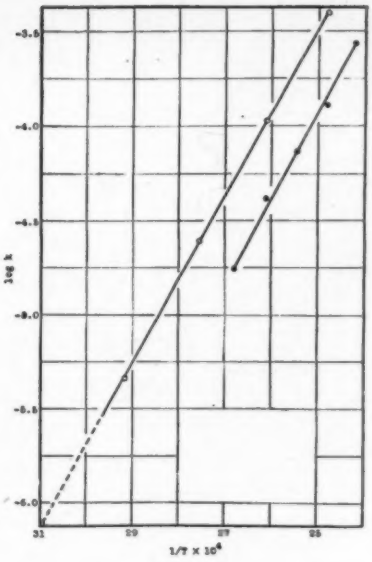


Figure 9

There has been some speculation as to the effect this phenomenon may have during cooking in sulphite liquor, and it can be shown that the effect, linear with time, will therefore probably not influence the pseudo-monomolecular rate relationship except toward the very end. This opens another avenue for investigation which is now being explored. There is no opportunity here to discuss hypotheses that have been put forward as to the relative effect of the two stages, sulphonation and lignosulphonic acid salt hydrolysis, but pretreatment experiments of a nature such as have been described may well throw some light on this controversial topic.

Rates of reaction were measured over the range of temperature 50 to 140C., and the constants for the rate of reaction determined for 3.4 and 9.75 per cent free SO_2. In Fig. 9 where the logarithms of the constants are plotted against the inverse temperature, straight lines are obtained showing that the Arrhenius equation $k = Ae^{-E/RT}$ holds. As is seen, the slopes of the two sets of results are the same within experimental error, and the energy of activation is found to be 21 $\pm$ 0.5 kilocalories, where A of course varies as expected with the concentration of the liquor used in the two sets. One interesting feature of these experiments is that they give powerful evidence that, whatever the mechanism of the delignification of wood is, it is the same over the whole range of temperature from 50 to 140C., and destroys the myth that cooking will only take place above 110C. Cooking experiments have been started at the Institute at room temperature; the rate is exceedingly slow, and more than a year is involved.

Periodate lignin

An investigation was carried out at the Institute by Dr. Purves on the isolation of lignin from wood. (I had no part in its inception or in any of the work which followed.) Except for lignin, the properties of the chemical constituents of wood have been studied when chemically pure. Attempts in the past to extract these other constituents from wood have left a lignin complex which never was completely free from holocellulose. More important, the extracted lignin must have undergone a change because it could not be dissolved in a standard bisulphite cook. Dr. Purves extracted all wood material other than lignin in a new way. He did this by repeatedly treating wood meal with a solution of sodium paraperiodate ($Na_3H_2IO_6$) at room temperature using a pH of 4, and alternately extracting the oxidized carbohydrates with boiling water. He obtained a golden-brown powder which answered to all the tests for lignin. Furthermore, this brown powder, conveniently called periodate lignin, dissolved almost completely in sulphite liquor under standard cooking conditions.

The rate of solution followed closely the rate of delignification of lignin in wood. Pretreatment of periodate lignin by heating it in buffer solutions of various pH have given identical results with those obtained with similar treatment of lignin in wood showing a minimum effect between pH 4 and pH 5. It is my opinion that this periodate lignin is closer in character to lignin as it exists in wood than any lignin complex previously prepared. This opens up a variety of new investigations, such as

cooking rate measurements over a large temperature range in different cooking liquors, these measurements to be made over a whole range of concentration of these liquors. Sorption experiments both with gases and electrolytes in solution and many other physico-chemical measurements would be of interest. Periodate lignin may well serve as a useful tool to give valuable information for the improvement of pulp production.

Alkaline cooking

The soda process, better named the alkaline process, depends on the ability of sodium hydroxide in aqueous solution to dissolve lignin out of wood at a reasonable rate when heated under pressure to 160C. The replacement of part of the sodium hydroxide by sodium sulphide increases the rate of delignification; the rather misleading name of "sulphate liquor" is commonly used for this cooking liquor. The investigations with which I have been personally concerned have been limited to using alkaline cooks without the addition of sulphide. In their investigation the same experimental technique was used of which I have already given an outline in connection with sulphite cooking.

The rates of reaction were measured at 120, 140 and 160C., and the psuedomonomolecular reaction relationship was found to hold down to 2 per cent delignification. The energy of activation was calculated to be 32.0 kilocalories, as compared to 21.0 kilocalories for the heat of activation with sulphite liquor.

Experiments on natural penetration had shown that sodium hydroxide, apart from having a much higher absolute diffusion rate through wood than acids, could penetrate equally well in all three wood directions. It was therefore expected and found that wood meal of 0.005 mm. particle size cooked at the same rate as chips having dimensions 20 by 10 by 2 mm. Cubical wood specimens up to 20 mm. edge were cooked and the results found to be in conformity with predictions based on forced and natural penetration measurements.

The influence of concentration on rates of cooking was measured, and it was shown that the rate increased. It was concluded that lignin cannot be dissolved until it is changed into a dilute alkali-soluble form. However, the increase in alkali concentration acts in two ways: first, in increasing the amount of this form and, second, at high concentrations in preventing it from leaving the pulp proper.

Most interesting results have been obtained by cooking wood with alkalis other than soda. Lithium, sodium, and potassium hydroxides at equal molecular concentrations cooked wood at rates in the ratio of 1 to 1.62 to 1.84, which is in the same order as their ionic mobilities

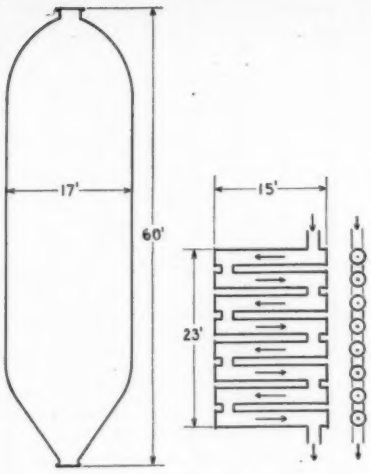


Figure 10

1 to 1.41 to 1.90. Mobility plays a part but is not the sole governing factor. Sodium hydroxide is soluble in methyl alcohol and ethyl alcohol, and these were substituted for water as the solvent in the cooking liquor. It was found that the rate in methyl alcohol was twice, and in ethyl alcohol four times, that in water.

We measured sorption of sodium hydroxide on wood over a temperature range up to 75C. and deduced that the lignin in it absorbs it according to a Freundlich curve, reaching approximately 3 per cent. It absorbs alkali to a much greater extent out of the alcohols. From this and a number of other experiments, a suggestion in part at least of the mechanism of the alkaline delignification of wood was formulated. This is at the moment purely tentative, and may be briefly described as follows:

There are three separate stages. (1) The acidic phenolic groups in the lignin contained in the wood bring about absorption of alkali. This sorbed reagent is at all times in saturated equilibrium with the alkali in the liquid phase, since diffusion under cooking conditions is always sufficiently rapid so as not to influence the reaction rate. (2) Following absorption, chemical combination takes place between lignin and the sorbed alkali. (3) There then follows chemical hydrolysis and the solution of the alkali-lignin complex into the liquor.

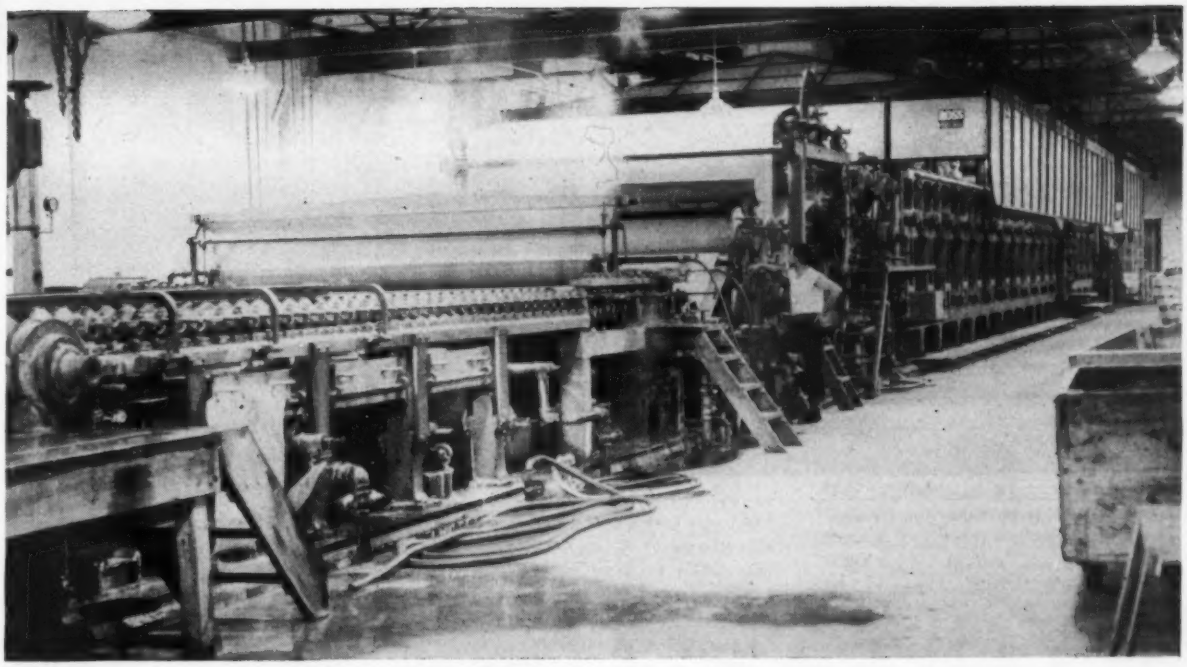
While in agreement with the data so far obtained, these ideas will have to be subjected to further tests which are now being planned. These include further determination of sorption data of different alkalis in a number of solvents on wood, cellulose, and periodate lignin in conjunction with more exact determination of comparative cooking rates over a variety of temperatures and concentration conditions.

I am one of those who are interested in seeing to it that fundamental work of the nature described is translated into practice. Much of that described has actually been applied, for instance, in the Va-Purge Process. However, it would take considerable time to discuss this aspect. Besides, some of it cannot be disclosed just now because of pending patent applications by the Institute.

Continuous pulping procedures

I would like, however, to point out some of the changes in future commercial practice which may be revolutionary. In review, between mechanical pulping with the maximum utilization of wood material, on the one hand, and the extraction of pure cellulose fibres, on the other, there is more than a 50 per cent loss of wood material. One way to avoid this is to cook wood chips with neutral sodium sulphite. This produces high-yield semi-delignified pulps included in what are commonly called semichemical pulps because mechanical treatment is applied after the cook. The pulps produced are colored and principally used to manufacture wrapping paper, cardboard, etc. The demand for packaging material is growing all the time. As contrasted to the batch (digester) production of semi-chemical pulp, a continuous pulp production procedure has been successfully developed. In Fig. 10 we compare the relative dimensions for batch and for continuous cooking equipment. On the right is a side and an end elevation of the size of a continuous cooker which has been developed outside the Institute and has come into operation at a number of places both on this continent and in Europe. It is compared with the size of a 20-ton digester. The digester (batch process) produces 50 tons a day, but the continuous cooker produces 130 tons a day with a fraction of the labor requirement for its operation. The contrast in cost of equipment and operation entailed must be apparent to anyone.

In the diagram we are comparing two different things, a sulphite digester and a semi-chemical cooker, in this case, continuous. The one can produce a high-grade sulphite pulp and the other, as it exists at present, a colored pulp which is used for wrapping paper and corrugated fibre board. However, if certain problems are solved, it should be possible that pulps of higher grade, perhaps even sulphite pulp, may be produced by a continuous pulping procedure. One of the main difficulties to be overcome is that of penetration. The Institute is participating in this development. If the dreams of the pulp producer come true, continuous pulping may, to a large extent, replace the batch process. That is what was meant by stating that some developments in pulp production in the near future may well be revolutionary.



New paper machine at Taylorville as seen from wet end

New Moore & White machine added in . . .

Hopper Paper expansion at Taylorville

HOPPER PAPER CO.'s postwar expansion program, beginning with the start-up of their Reading, Pa., plant in 1946, achieved another significant advance with the starting of a new fourdrinier paper machine in Taylorville, Ill., this spring. This latest step, a $1,500,000 project, was initiated in December, 1950.

The only remaining portions of the project which are yet to be completed are the construction of a storage building and new equipment at the railroad dock.

The new construction and installation was under the direction of J. L. Mullin, vice-president and general manager. Precision engineering and technical planning aides to Mr. Mullin were C. Everett Shaw, master mechanic, and Mike T. Trojcak, chief engineer.

The program included a completely integrated unit involving new construction for raw stock receiving and storing, full stock preparation equipment, the paper machine, and additional truck loading docks for shipment of finished material.

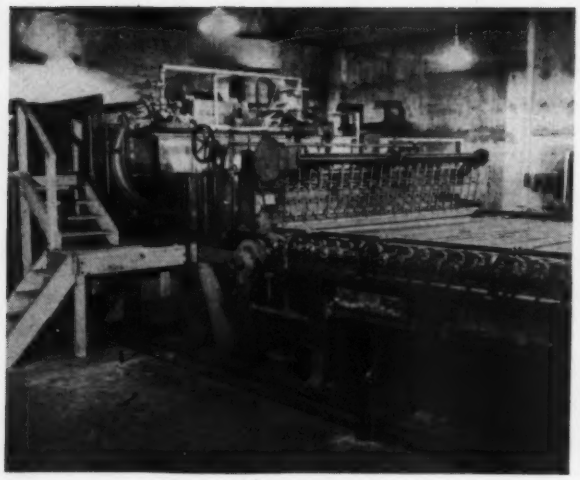
The project was necessary to acquire much needed additional production, as well as flexibility in manufacturing. The new machine will make primarily offset paper, text, and fine paper specialties.

Architects on construction were Gregg & Briggs of Peoria. The contractor was V. Jobst & Sons Co., also of Peoria. Construction is of poured concrete and steel, adding approximately 67,000 square feet to the present plants. Exterior is rubbed surface with aluminum trim. Roofing is 4-ply built-up. The windowless construction aids materially in control of operating conditions in the machine room. The addition is built in the form of an "L" with the extended section running from the receiving platforms. From that point, all raw stock is handled by the semi-automatic materials handling equipment within the ramp type structure directly to the pulpers. The new layout permits a direct flow in all operations from receiving and storing to making, finishing, and shipping.

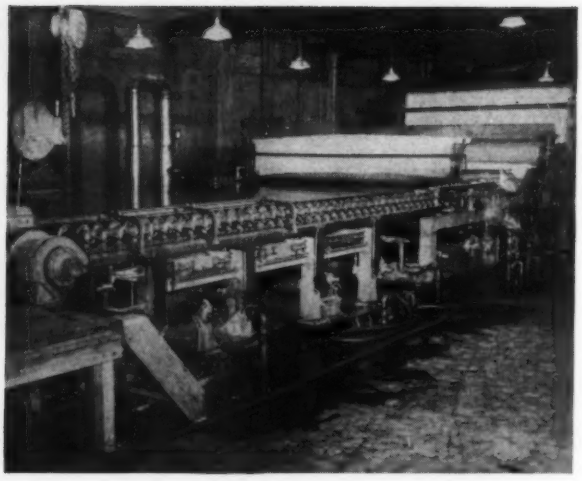
Paper machine

Stock moves from the Apmew Aquabrushers to the Emerson jordans placed in parallel. Bird screens and Valley Iron Works flow box and inlet deliver the stock to the Moore & White fourdrinier paper machine. All rolls and moving parts are balanced for a speed range of 100 to 600 feet per minute. The fourdrinier is the non-removable type designed for a 70-foot wire, 136 inches wide. Length from the head box to the reel is 194 feet.

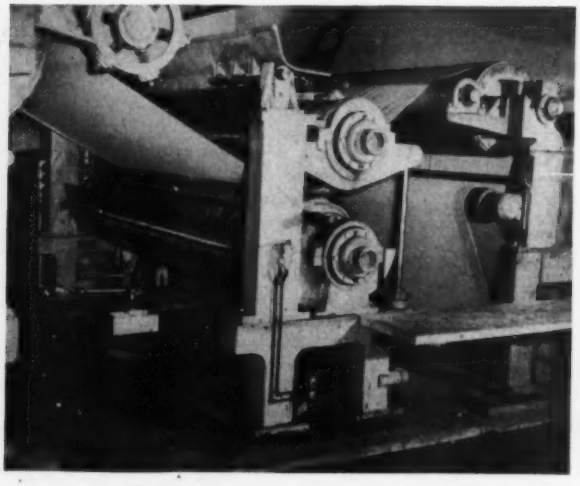
Micarta springs support the shake rails, breast roll, and save-all pans. All parts which carry stock are of stainless steel and corrosive resistant. The entire



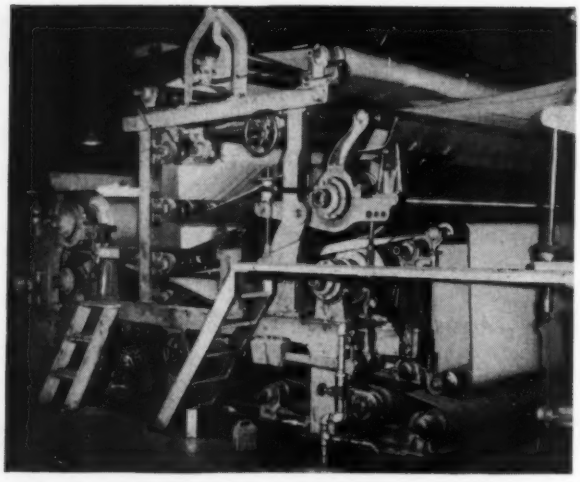
Flow box and inlet by Valley Iron Works



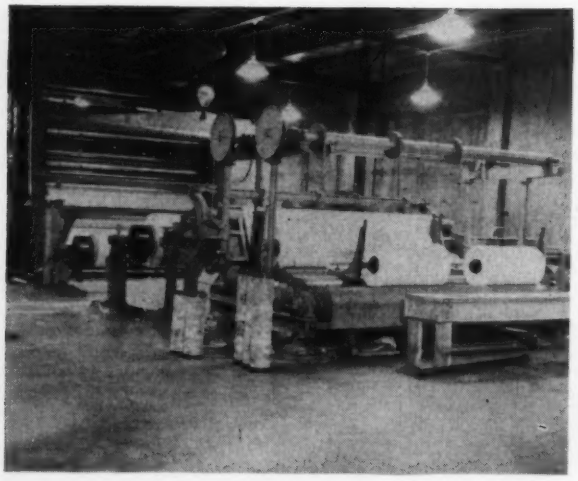
Moore & White press section from wet end



Size press by Moore & White



Close-up of the press section



Reel and rewinder newly installed by Hopper

Machine drive showing Syco-Drive units

machine is equipped with anti-friction bearings. Air-operated clutches are all on the tending side to provide easy control.

The Downingtown suction couch is 28 inches in diameter. There are two M & W main presses, one smooth press and a size press, the latter located after the 24th dryer. Thirty 48-inch diameter M & W dryers are used with four 36-inch diameter felt dryers.

The eight-roll Farrel-Birmingham calender with babbitt-lined, water-cooled bearings will adequately handle all of the machine finishes required. The M & W reel is a two-drum upright type. The spools are removable for reversing the sheet having horizontal and lateral adjustment. The four-drum M & W winder and high speed slitter will wind 36-inch diameter rolls.

The machine is driven by a Westinghouse turbine, 250 hp at steam pressure of 185 pounds, activating an M & W Syco-Drive, which will drive the six major sections, couch, first press, second press, dryer sections, size press, and calender.

Auxiliary operations such as electrical work were contracted to Durham Electric Co., of Springfield, and plumbing and heating work was done by Hitchcock Sprinkler & Heating Co. of Peoria.

Ventilation

A complete air exhaust and replenishment system was furnished by J. O. Ross Engineering Corp.

The machine hood is of the suspended type of Transite and steel construction with exhaust stacks and exhaust fan penthouses which are located on the roof of similar construction.

Two large penthouses are provided on the roof to house the heating coils and supply fans for the air make-up and ventilating systems. The air systems are sized to provide effective ventilation over the ceiling area to prevent drip in cold weather and also provide a substantial air balance between the air exhausted from the machine hood and the air replaced by mechanical means through the ventilating system.

The machine itself is fitted with a Ross-Grewin system delivering high pressure heated air through a system of copper piping to the vapor pockets on the machine. This system acts to increase the capacity of the dryers and provide for greater uniformity of drying across the width of the sheet.

A Ross calender cooling system delivers cool, filtered air from the basement under the machine through a system of piping with provision for directing cool jets of air against the calender rolls as required. This system aids in winding uniformly tight and solid rolls.

On the occasion of the start-up of the new machine, B. C. Hopper, president of Hopper, discusses the first paper on the machine with George A. Lear, president of Moore & White.

J. L. Mullin
Vice president
and general manager

Hopper's 30th year

It was in 1922 that Bertrand Hopper of Kalamazoo, Mich., purchased the E-Z Opener Bag Co. plant in Taylorville. He immediately set to work to restore the property and start it on the way to the position it now holds in the industry. On his death in 1934, the presidency was assumed by his son, Bertrand C. Hopper, then 24.

Since taking the challenge of administration, Mr. Hopper has sparked company expansion—in sales, financial stability, and facilities. The original mill supplied the demand of 30 years ago, but since that time increasing paper consumption has made expansion of production necessary. In 1946 a new eastern mill was started at Reading, Pa., increasing total capacity by 70 per cent. And now once more Hopper finds its output not up to demand. Hence, the present project which adds another 70 per cent.

Working closely with Mr. Hopper is J. L. Mullin, vice president and general manager, who joined the firm in 1934 as mill superintendent. He became manager in 1939. Mr. Mullin has spent a lifetime in the industry and is known as one of the outstanding technicians in the field.

Dryer section

The dryer section is equipped with a Midwest-Fulton forced vapor circulating system, which controls the dryer surface temperatures and the evacuation of condensate and non-condensible gases. This positive drainage permits the Foxboro instruments, which are a part of the system, to closely control the steam admission so that the dryer surfaces are maintained at uniform required temperatures.

Press section felts are equipped with Bird Vickery conditioners with "Jordan" type vacuum boxes and high speed gear boxes designed to treat approximately 450 square feet of felt per minute.

A Bird save-all is incorporated in the closed white water system providing maximum stock recovery and immediate re-use of clarified water.

Jordans are the latest No. 2-A Emerson built with Timken bearings on both the radial and thrust end mounted in a cast-iron housing. The jordans are supplied with a stainless steel jacketed wedgeless plug. Construction is such that it is simple to remove the entire housing both at the radial and thrust end when necessary, without disassembly of the bearing itself.

Water is in abundant supply in an underground lake directly under the plant. It remains throughout the year at a constant temperature and is remarkably free from hardness, requiring no special treatment for the making of quality papers. Four 300 G.P.M. Cook deep well pumps supply all of the water required for the additional tonnage.

Taylorville is located adjacent to the southern Illinois coal fields, so fuel is ready at hand and available in substantial supply.

No major change has been made in the finishing operations where, in addition to cutting, trimming, and packaging of book and writing papers, a great many operations of embossing, plating, and decorating are done.

Additional equipment

In the completed Taylorville project, additional equipment was supplied by the following firms: stock and water chest linings, Kalamazoo Tank & Silo Co.; stock pumps, DeLaval Steam Turbine Co.; Vortraps, Nichols Engineering & Research Corp.; vacuum pumps, Nash Engineering Co.; tanks, Leader Iron Works, Inc.; doctors, Lodding Engineering Corp.; water pumps, Peerless Pumps Division; water supply tank and tower, H. P. Young Co.; sprinklers, Grinnell Co., Inc., water softener, Stover Water Softener Co.

IT WAS THE CUSTOM IN 17th CENTURY

England for print shops once a year to renew their paper windows. The journeymen did the job and received as a reward a banquet which was staged by the master printer. . .

CORNUCOPIAS

made of paper seem to be replacing the cloth pastry tube in many bake shops for decorating cakes and pies. These funnel-shaped tubes are made from triangular pieces of paper and can be discarded when they have served their purpose.

AT THE BEGINNING

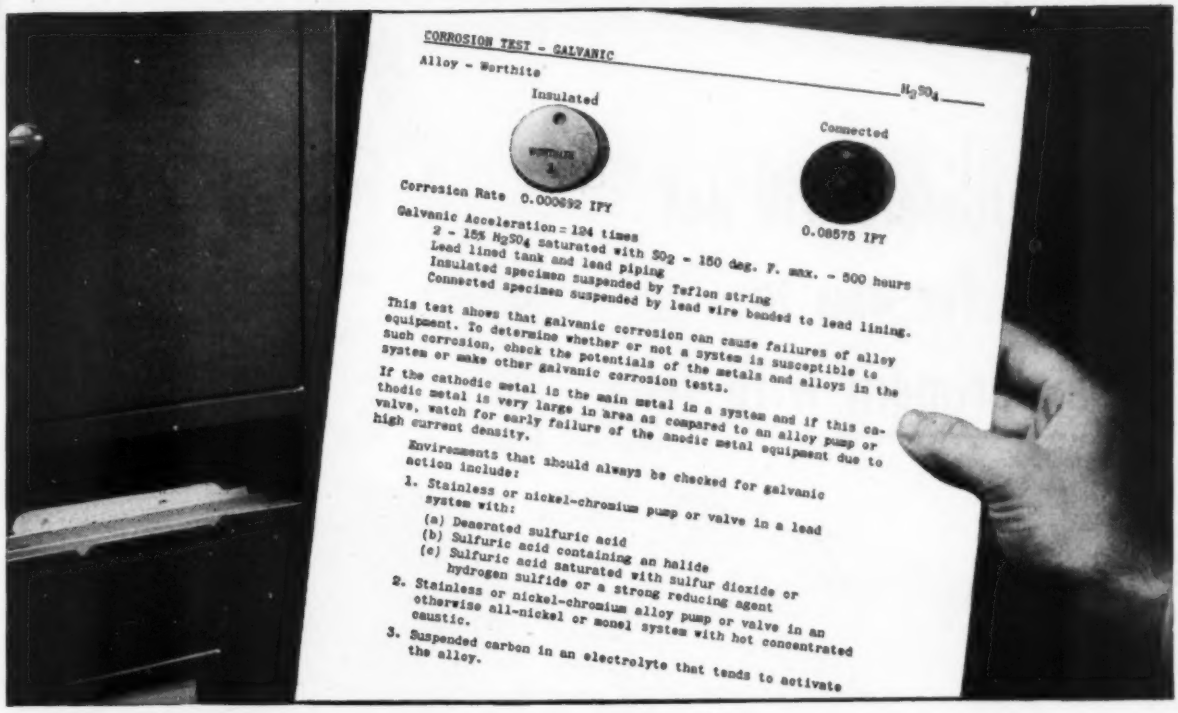
of the Christian era, Roman-made papyrus was considered whiter and better than the Egyptian products.

The Romans sized their papyrus with flour and beat its layers with a hammer.

Odd Bits

In the 1850s, it is said, pipes made of paper were used to convey water in certain sections of France.

These paper pipes were coated with bitumen to help make them water tight.


CORROSION TEST - GALVANIC
Alloy - Worthite
H_2SO_4
Insulated
Connected
Corrosion Rate 0.000892 IPY
0.08575 IPY
Galvanic Acceleration = 124 times
2 - 15% H_2SO_4 saturated with SO_2 - 150 deg. F. max. - 500 hours
Lead lined tank and lead piping
Insulated specimen suspended by Teflon string
Connected specimen suspended by lead wire bonded to lead lining.
This test shows that galvanic corrosion can cause failures of alloy equipment. To determine whether or not a system is susceptible to such corrosion, check the potentials of the metals and alloys in the system or make other galvanic corrosion tests.
If the cathodic metal is the main metal in a system and if this cathodic metal is very large in area as compared to an alloy pump or valve, watch for early failure of the anodic metal equipment due to high current density.
Environments that should always be checked for galvanic action include:
1. Stainless or nickel-chromium pump or valve in a lead system with:
(a) Deaerated sulfuric acid
(b) Sulfuric acid containing an halide
(c) Sulfuric acid saturated with sulfur dioxide or hydrogen sulfide or a strong reducing agent
2. Stainless or nickel-chromium alloy pump or valve in an otherwise all-nickel or monel system with hot concentrated caustic.
3. Suspended carbon in an electrolyte that tends to activate the alloy.

A CASE STUDY FROM THE WORTHINGTON FILES. This Worthington test sheet indicates that the galvanic action could be virtually eliminated in this manufacturer's system by *insulation*—that is, a complete separation of the alloy pump from metallic contact with lead surfaces. The recommendation was made to him as a result of a Worthington test made on the solutions his system was pumping.

It Takes More Than A Pump To Solve A Pumping Problem!

Worthington's files are packed with many stories like this one. Each is proof positive that you get a lot more than a Worthite* pump when you buy from Worthington.

It was the age-old problem of chemical pumping, corrosion. But this customer found a way out—a *practical solution* that saved him plenty of expense in extra maintenance and lost production time.

He wrote a letter to Worthington. Could we tell him whether there was anything he could do to slow down or stop this corrosion? He was pumping a 15% solution of sulfuric acid saturated with sulfur dioxide. Maximum temperature of solution was 150° F.

This wasn't a new problem for Worthington corrosion specialists. Experience had shown them that under these conditions galvanic action could be his trouble. They ran the test illustrated above which conclusively proved these assumptions correct.

Result? The customer insulated the system and his troublesome corrosion problem was brought under control.

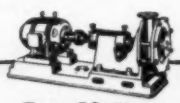
At Worthington, we welcome the chance to hear about *your* pumping problems—either on a present installation or in the design of a new system. For it is only through such close contact with the industry that we can continue to build the kind of pumps and offer the kind of services that have led pump users the world over to the conclusion that *there's more worth in Worthington.*

Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.

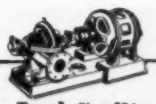
*Reg. U. S. Pat. Off. C.1.6

Types CG and CGL. Sizes ¾" to 10". Capacities to 5000 GPM; heads to 200 ft. Liquid ends of WORTHITE.

Type CF. Sizes 1" to 4". Capacities to 1000 GPM; heads to 130 ft. Standard, all iron and all bronze.



Type CQ. Sizes 1¼" to 3". Capacities to 600 GPM; heads to 130 ft. at 1750 RPM. Closed impeller.



Type L. Sizes 3" to 8". Capacities to 2250 GPM; heads to 300 ft. Single stage volute. For general service.

WORTHINGTON

Centrifugal Pumps

The World's Broadest Line Assures You the Right Pump for Every Job

Customers will not wait for you to experiment with felts

In these highly competitive times every buyer of paper or board has access to many sources of supply at prices he knows to be in line. If you expect to get your share of his business your machines must be equipped with felts that will turn out quality at quantity prices.

This is where you need the experience of the Hamilton Felt sales engineer. His vast experience in the paper industry is at your command without cost or obligation. With more than three hundred different styles of felts from which to select, he is a very valuable man to have in consultation.

Hamilton Felts

MIAMI WOOLEN MILLS

Established 1858

SHULER & BENNINGHOFEN, HAMILTON, OHIO

The Paper Industry Association News

Hartman Elected to Head Michigan Supts.

Harvey W. Hartman, mill superintendent for American Box Board Co. in Grand Rapids, has been elected chairman of the Michigan Division of the Superintendents Association for 1952-53. The election took place at a business meeting of the Division on July 15 at Kalamazoo Country Club in conjunction with the group's annual Sports and Feld Day.

Other officials selected at the meeting were as follows: first vice chairman, Leo H. Mimms, Kalamazoo Paper Co.; second vice chairman, Robert E. Burkhardt, St. Regis Paper Co., and secretary, Harrison H. Kindig, Mac-Sim-Bar Paper Co.

In charge of the arrangements for the gathering were F. C. Goodwill, St. Regis Paper Co. (chairman); J. D. Dickson, Stowe-Woodward Co., and C. E. Van Buren, Albany Felt Co.

H. W. Hartman

C. A. M. Vining

Vining Resigns from Newsprint Assoc. of Canada

The Newsprint Association of Canada has announced that *CHARLES A. McL. VINING* has resigned as an officer of the Association after 18 years service. He was president of the Association from 1934 to 1946 and has been chairman of the executive committee for the past six years. He was also chairman of the joint executive board that acted for the NAC and the Canadian Pulp & Paper Association prior to 1946.

During World War II Mr. Vining was assistant to the chairman of the Wartime Prices and Trade Board at the start of price control in 1941 and was the first chairman of the Wartime Information Board in 1942. He was also, from 1940 to 1945, associated with Sir William Stephenson in the work of British Security Coordination, which conducted British intelligence and security operations in the Western Hemisphere.

Bleaching Processes Discussed at Niagara Falls Meeting

New bleaching processes in the making of paper were discussed recently at a joint business session of the Niagara branch of the CPPA Technical Section and the Empire State Section of Tappi. The gathering was at Niagara Falls, Ont.

It was reported by the various speakers that new and revolutionary processes are being found, and that forward steps are being made in the technical branch of the industry.

Robert Drummond, International Paper Co., Glens Falls, N.Y., was elected convention chairman; D. C. Mather, Carthage Paper Makers Inc., Carthage, chairman-elect, and Ralph K. Prince, American Cyanamid Co., Castleton-on-Hudson, secretary-treasurer.

Top Selling Job Needed, Ferguson Tells SAPI

That good salesmanship is needed now to get new products and new uses to the markets was the advice given recently by Sydney Ferguson as he addressed a dinner meeting of the eastern division of the Salesmen's Association of the Paper Industry. Mr. Ferguson is chairman of the board of The Mead Corp.

"For the first time since 1938, with the exception of a short period in 1949," he declared, "we find the immediate demand for pulp, paper and paperboard less than the available supplies. In other words, we have swung over from a sellers' to a buyers' market. This seems to have given the industry (and to a greater degree, those who are outside the industry) more concern than, in my judgment, is justifiable."

Reviewing the past 13 years, the speaker noted that there has been almost a continuous rise in the price level. He said that between 1949 and the outbreak of the war in Korea there was a general softening of the market. The Korean incident set off a world-wide spree of scare buying, which is highly inflationary. The result was that a series of apparent shortages occurred. Fortunately, calm judgment prevailed, as evidence of abundant supplies was presented to the housewife.

"Another world-wide shortage, so-called, developed in wood pulp and paper," Mr. Ferguson continued. "Consumption of paper and board has, of course, a growth pattern which it follows with reliable regularity, but buying went way beyond this pattern in many grades. That was particularly true of paperboard which . . . has one of the sharpest upward-moving growth curves in the industry, and those buyers who in 1949 had cut back their requisitions of board from the suppliers had found great difficulty in regaining their positions later on when their needs increased. They therefore in 1951 and early in 1952 kept on taking their full quota of board.

". . . During the past year the paperboard group has been obliged to curtail production to a considerable extent as compared with the first six months of 1951. The paperboard production ratio has dropped to 83 per cent from 105 per cent of capacity in 1951. The paper segment of the industry did not rise so high and did not feel the drop until within the last month or so, and even then its production ratio was over 90 per cent of capacity during April.

". . . The production record of your industry has been spectacular and is well known to all of you. Under the stimulus of Tax Amortization Certificates issued by the Defense Production Administration, a considerable increase in paper, board and pulp making capacity is in prospect in the next few years."

Current Situation

Surveying present conditions, Mr. Ferguson declared that "we are in a lull period of the cold war. The Communists have been slowed down and set back in Korea.

"With increased production and increasing capacity, the industry is apparently going to be able to meet the normal demand for its product, including the normal growth, which as noted before is at a high rate. Barring a reheating of the cold war with an accompanying rush of protective buying, we as salesmen face a prospect that is challenging to us. How are we going

to meet it? Certainly, not by merely accepting things as they are.

"As you all know, the great growth of the paper industry during the last quarter-century has not been due primarily, but only incidentally, to the growth of population. The big jump has been the result of the broadening of the uses for paper. While the industry has not, of course, stood still during the long sellers' market that we have experienced, it is a certainty that neither have its inventive brains to discover new uses been fully stimulated, nor have the potential markets for many of these products been fully exploited. This is not said by way of criticism, since obviously there is little need to find new uses or to expand markets when the mills are running full—indeed, it is almost impossible to do so and at the same time treat existing customers fairly.

Long-term thinking

"Easy times, however, have provided golden opportunities for salesmen who have not had to give so much of their energy to actual selling, to devote more and more of their time to long-term thinking about the proper merchandising of the products of their various companies. I am sure that there are many avenues which must have occurred to you and that now, more than ever before, you will find mill managements and research departments receptive and ready to do everything possible to cooperate with you. The thought that you have put into your work in the last 10 years is now going to bear fruit. What is needed now is the energy to get new products and new uses to the markets."

Pacific Coast Supts. Hold 33rd Annual Meeting

The formation of permanent committees on kraft pulping, sulphite pulping, finishing, and papermaking was the high spot in the 33rd meeting of the Pacific Coast Division of the Superintendents Association. The gathering was held at the Monticello Hotel in Longview, Wash., May 23.

Mill visits were featured during the morning session, while the afternoon portion of the meeting consisted of the technical meeting and the business meeting. R. A. Goodwillie discussed "Recent Developments in Paper Machine Design," and C. T. Beals spoke on "Practical Slime Control in a Specialty Mill." Mr. Goodwillie is associated with Beloit Iron Works, Beloit, Wis.; Mr. Beals, Crown Zellerbach Corp., Camas, Wash. The speaker at the dinner was E. G. Swigert of Electric Steel Foundry Co., Portland, Ore.

Temporary chairmen of the four newly formed committees are: kraft pulping—Hugo Trygg, Weyerhaeuser Timber Co., Springfield; sulphite pulping—Jack V. Savage, Crown Zellerbach, Camas; finishing—Cecil Knapp, Crown Zellerbach, Camas, and papermaking—Charles E. Ackley, Crown Zellerbach, West Linn.

Joint Fall Meeting Slated

The 1952 fall meeting of the Pacific Coast Division will be held in Victoria, B.C., at the Empress Hotel. The gathering will be staged in conjunction with the Triway Meeting of the Pacific Coast Section of Tappi and the Pacific Coast Branch Technical Section of the CPPA. The dates are September 25-27. M. F. Smith of Sidney Roofing Co., Victoria, is general chairman. The three associations are collaborating in the development of a program, which will be announced later.

This will be the second Triway Meeting. The first was held at the New Washington Hotel in Seattle in May 1950 and drew an attendance of nearly 450.

Work Closely with Lawyers, Purchasing Agents Told

Members of the Pulp and Paper Manufacturers Buyers Group were recently advised at a meeting in Atlantic City to get to know their lawyers better. "Purchasing agents need to work closely with legal counsel because their jobs are much more complex and involve more responsibilities than ever before," they were told at a session in conjunction with the National Association of Purchasing Agents.

The speaker, Charles S. Maddock, assistant director of the legal department of Hercules Powder Co., Wilmington, Del., declared that "better liaison between purchasing agents and attorneys will establish purchasing procedures that will help a company avoid undue legal hazards and at the same time assist the purchasing department in the performance of its work."

"The lawyer's greatest value will come not so much in advising how to get out of the trouble you are in," Mr. Maddock stated, "but rather in providing guideposts that you can follow in avoiding legal pitfalls—in short, your attorney can offer the most service if he practices preventive law."

Mr. Maddock cited some of the ways in which the purchasing function of modern industry has become more complex in recent years. "Today's purchasing contracts are more detailed, more specific, and more complex than ever before," he said. "Provisions covering price protection, price escalation, Fair Labor Standards Act are now standard teminology in purchasing contracts."

"Court decisions and legislation impose new obligations on buyers," he declared. "The Robinson-Patman Act and ceiling price regulations, as examples, apply to buyers as well as sellers."

As evidence of the increased complexity in purchasing, the speaker called attention to the fact that there are now 33 major functions that are the responsibility of a company purchasing department, as against the fairly routine type of job several years ago.

"The assumption of these new responsibilities has brought the need for new knowledge in technical fields, and also knowledge of the legal problems involved," he pointed out. "If purchasing men don't develop this necessary know-how, they will find that someone else in their organization will end up doing their purchasing for them."

Southern Forestry Assoc.
recently elected George V. Gaines of Atlanta and Don Weddell of Athens directors. They were named at a two-day meeting of the group in Chattanooga. Principal speaker at the gathering was Frank Heyward, chief of the pulpwood branch of NPA.

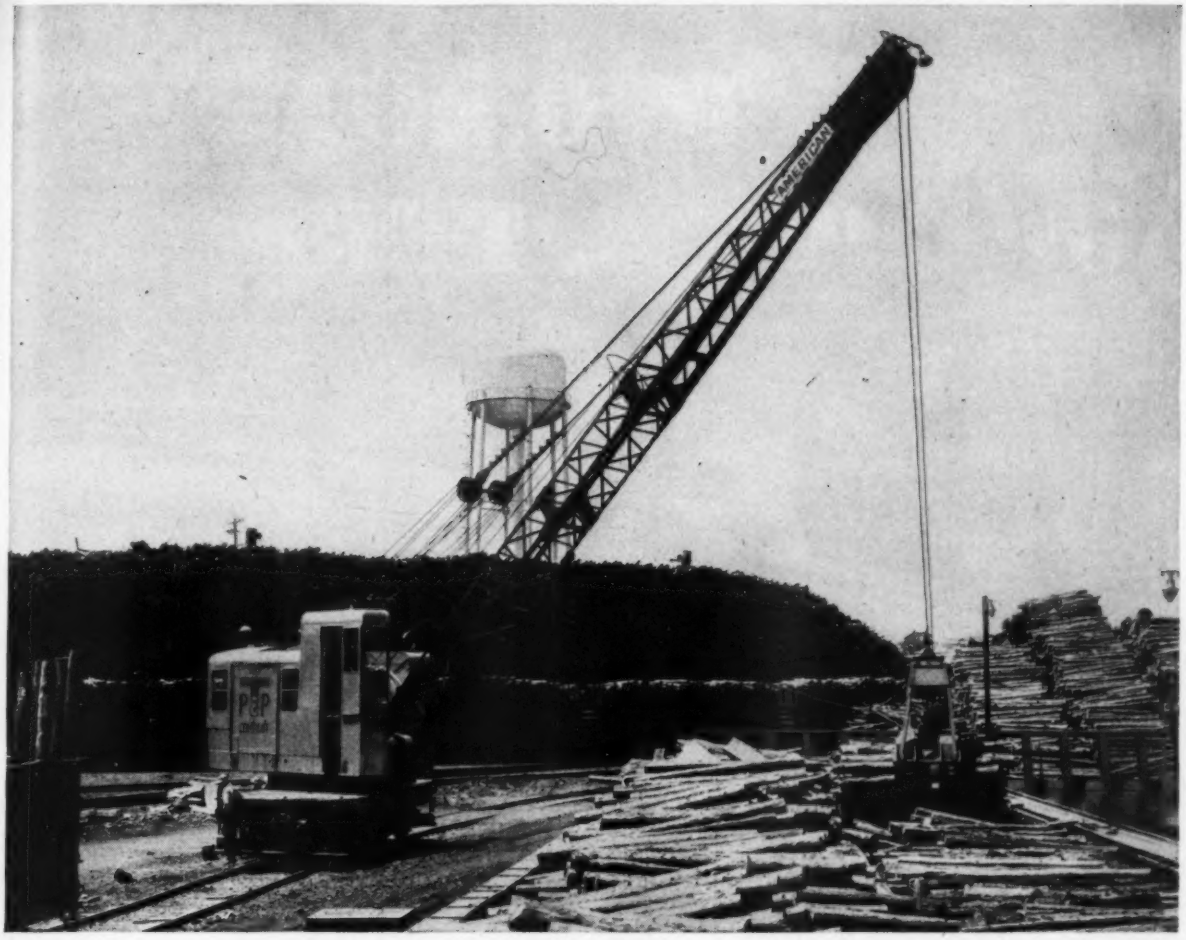
Wisconsin-Upper Michigan
Section of the Society of American Foresters has elected Stanley S. Locke of Milwaukee to serve as 1952 chairman. Mr. Locke is regional forester for the United States Soil Conservation Service midwest region.

1952 Fall Meeting
of the Pennsylvania-New Jersey-Delaware Division of the Superintendents Association will be held September 26-27 at Galen Hall Hotel, Wernersville, Berks County, Pa. The announcement was made by Elmer Mitchell of Glassine Paper Co., Manayunk, chairman of the Division.

Hammermill Paper Co.
was host June 17-18 at a general symposium on wood handling staged by members of the Appalachian Technical Committee of the American Pulpwood Association. The Erie, Pa., program consisted of three half-day sessions, with each session being divided between field observation of wood-handling methods and a group discussion of the technical problems involved. A half-day each was spent at Hammermill's pulpwood dock, at the mill's east and south wood yards, and in the firm's new million dollar wood room.

Connecticut Valley Division
of the Superintendents Association will hold its 1952 fall meeting October 11 at the Berkshire Inn, Great Barrington, Mass.

Two Scholarships
to students in the paper engineering course at Lowell Textile Institute, Low-



Winner and still champion in the pulpwood handling field

Can you think of a tougher materials-handling job than storing and handling pulpwood? Here, your yard superintendent must unload his cars at a high-speed clip . . . and stack the wood to dizzy heights, to save ground space . . . and service a storage yard immense in area . . . and yet keep his cost per ton down to rock bottom.

In view of these facts, it is a wonderful tribute to American Locomotive Cranes that they are such great favorites in the nation's pulp and paper mills. Today, as for many years past, they are the No. 1 choice of the industry.

The reasons are clear and compelling. American Locomotive Cranes need only a one-man "crew". They can travel great distances at top speed while swinging, booming and lifting simultaneously. Maintenance costs have been cut most remarkably . . . and "down" time has almost completely vanished.

Why not compare your present pulpwood handling costs with the records of the new American Diesels and DiesELectrics. We'll be glad to furnish facts and figures for your study.

2808

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American Hoist
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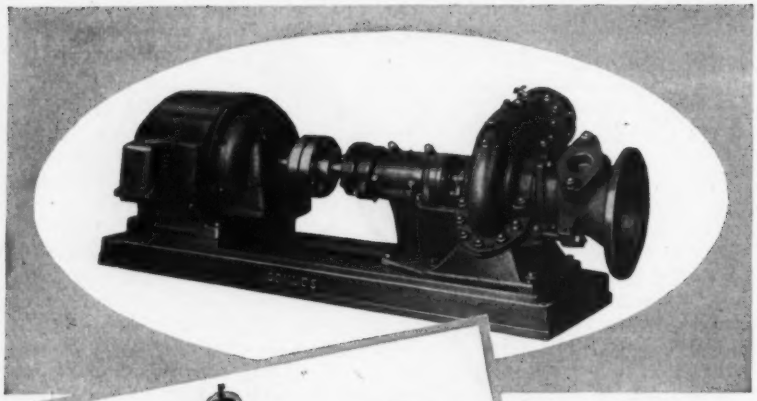
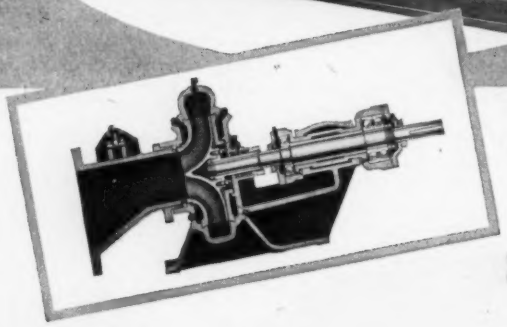
For the BIG PRODUCTION jobs of industry...

AMERICAN LOCOMOTIVE CRANES





4 reasons why

GOULDS STOCK PUMPS REDUCE STOCK HANDLING HEADACHES

1. ***Positive even flow.*** **The inlet tips of impeller vanes are warped to give a screw conveyor effect which insures an even flow and prevents water separation of the paper stock.**

2. ***No jamming.*** **Ejector vanes follow curvature of main vanes of impeller, preventing entrance and jamming of stock or other solid material between back impeller wall and stationary wearing plate.**

3. ***Easy to adjust for wear.*** **Shaft and impeller can be moved axially toward suction side plate to take up wear due to abrasives in material handled.**

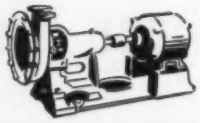
4. ***Easy to inspect and maintain.*** **You can inspect or renew rotating element without disturbing bearing assembly. Ample washout connections at top and bottom of casing. Stuffing box readily accessible and stuffing box gland easily removable.**

Goulds centrifugal stock pumps are especially designed for efficient handling of paper stock of all kinds and consistencies in mills of all types.

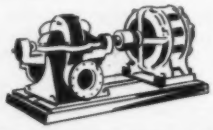
The heavy duty unit (Fig. 3105) illustrated above will deliver up to 4000 G.P.M. Heads up to 220 ft. Available in 4″, 6″, and 8″ sizes. For detailed information, complete specifications, write for Bulletin 723.1.

Other GOULDS PUMPS for Pulp and Paper Mills

This rugged vertical centrifugal stock pump (3115) requires minimum floor space. Available in capacities 150 to 2000 G.P.M. Heads up to 180 ft.



Stainless steel pump for handling acid and alkaline liquors. Capacities up to 600 G.P.M. Heads up to 160 ft. (3705).



For capacities up to 15,000 G.P.M. Heads up to 500 ft. Check the specifications of this Goulds ball bearing double suction centrifugal (3450).

MEMBER

Goulds PUMPS INC.
Seneca Falls
New York

ell, Mass., each sponsored by a paper trade association, were awarded recently. Norman E. Scott of the New England Paper Merchants' Association, Boston, presented $150 to Lawrence Hince of Lowell, a freshman at Lowell, on behalf of the association; and, for the Boston Paper Trade Association, the sum of $150 to Arthur Dracut, a sophomore. Mr. Scott is secretary of both organizations.

Coming Events

TAPPI meetings

Sept. 25-27—Pacific Coast Section (joint meeting with the Pacific Coast Division, Superintendents Association, and the Pacific Coast branch Technical Section of the CPPA), Empress Hotel, Victoria, B. C.

Oct. 13-16—Seventh Engineering Conference, Morrison Hotel, Chicago.

Oct. 27-28—Fibrous Agricultural Residues Conference, Northern Regional Research Laboratory, Peoria, Ill.

Nov. 5-6—Plastics Conference, State University of New York, College of Forestry, Syracuse.

Nov. 12-14—Sixth Annual Alkaline Pulping Conference, Battle Hotel, Mobile, Ala.

Nov. 20-21—Corrugated Container Conference, Hotel Schroeder, Milwaukee.

American Pulp & Paper Mill Superintendents Association meetings

Sept. 18-21—Northeastern Division, Poland Spring House, Poland Spring, Maine.

Sept. 25-27—Pacific Coast Division (joint meeting with the Pacific Coast Section of Tappi and the Pacific Coast branch Technical Section of the CPPA), Empress Hotel, Victoria, B.C.

Sept. 26-27—Pennsylvania-New Jersey-Delaware Division (fall meeting), Galen Hall Hotel, Wernersville, Berks County, Pa.

Oct. 8-10—Southern and Southeastern Divisions (joint meeting), Hotel Roanoke, Roanoke, Va.

Oct. 11—Connecticut Valley Division (fall meeting), Berkshire Inn, Great Barrington, Mass.

Other meetings

Sept. 8-12—Instrument Society of America, National Instrument Conference and Exhibit, Cleveland.

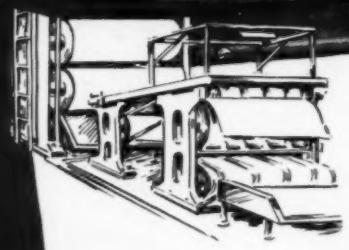
Sept. 9-13—Seventh National Chemical Exposition, Coliseum, Chicago.

Oct. 13-16—Printing Industry of America, Chase Hotel, St. Louis.

Oct. 13-16—Society of Industrial Packaging and Materials Handling Engineers, annual short course, Chicago.

Oct. 20-24—National Safety Congress and Exposition, Conrad Hilton, Congress, Morrison, and Sheraton hotels, Chicago.

AIMED AT BETTER ROLLING



MIDVALE HARDENED AND GROUND FORGED STEEL MILL ROLLS

Forged steel rolls have been a Midvale specialty for many years, but every new one made is aimed at doing a better job than ever before. Skill and experience of Midvale craftsmen assure rolls built to your most exacting specifications of hardness and finish. Modern equipment and quality control —from furnace to finished roll—produce rolls unsurpassed in quality and performance.

Whatever your needs for heavy equipment in industry Midvale can assure you of precision and performance. Whether it is a roll for your mill . . . roll shells for mining and cement industry . . . pressure vessels for the chemical and petroleum industries . . . rings for turbines and gears . . . or castings and forgings for any industry . . . Midvale can make them to your most exacting specifications.

Pressure Vessels
Forgings and Rings
Hardened and Ground Steel Rolls
Corrosion and Heat Resisting Castings
Ordnance and Armor

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Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Specialty Papers Co.

Western Waxed Paper Co.

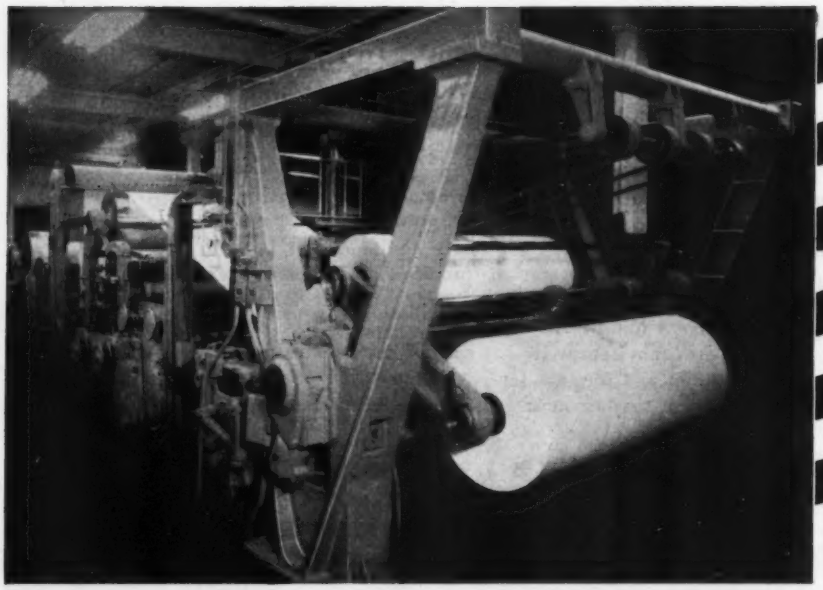
Hollingsworth & Whitney Co.

Rhinelander Paper Co.

Individual Drinking Cup Co., Inc.

General Foods Corp.

Quality products are produced on Dilts waxers



Minerva Wax Paper Co.

Zimmer Paper Products, Inc.

Nekoosa-Edwards Paper Co.

Pacific Waxed Paper Co.

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Write for our new Waxing Bulletin 9-DM

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The Paper Industry Names in the News

PRESENTATION OF THE Star of Italian Solidarity medal to J. D. Zellerbach, president of Crown Zellerbach Corp., at a recent ceremony; Minister Justo Giusti del Giardino of Rome (left), special emissary of Italy's president, made the award in appreciation for Mr. Zellerbach's work as administrator of ECA for two years in Italy

Bromley APA's New Executive Secretary

W. S. BROMLEY, who has been acting secretary since May 1, assumed the office of executive secretary and treasurer of the American Pulpwood Association July 1. He succeeds H. E. Brinckerhoff, who directed the Association since 1939.

A graduate of Pennsylvania State College and holder of a master's degree from Yale, Mr. Bromley at one time was an assistant forester with the U. S. Forest Service. In 1939 he joined the faculty of the University of Michigan, where he specialized in research on logging and the utilization of land and timber. During World War II, he was forester for Cleveland Cliffs Iron Co., supervising the management of timberlands in Upper Michigan.

At war's end he established his own consulting forestry firm at Ironwood, Mich. The acquisition of more than 2,000 acres of forest land for operation and management led to his getting into logging as a pulpwood producer, and later as a director of the Timber Producers Association of Michigan and Wisconsin.

Gardner Announces Six Staff Appointments

Gardner Board & Carton Co., Middletown, Ohio, has announced the promotions of *ED HANNA,* who becomes staff assistant to the superintendent at the Middletown carton plant, and of *BENJAMIN E. RILEY,* who takes a similar post at the Lockland carton plant.

Mr. Hanna joined the firm in 1936, becoming general foreman of the printing department in the Gardner retail box plant in 1946. In 1951 he was assigned to the Gardner executive management training program and attended the printing school at the West Virginia Institute of Technology.

Mr. Riley, who joined Gardner in 1950 as a senior industrial engineer, also attended the executive management training program. Prior to his association with the firm, he operated his own business in the distribution field. He is a graduate of the Rensselaer Polytechnic Institute.

WILLIAM R. CSELLAK, who joined the company in 1949 as a management trainee, has been promoted to the position of staff assistant to the technical director. He is a graduate of Lehigh University, Institute of Paper Chemistry, and attended the printing school at the West Virginia Institute of Technology. *HENRY E. CROUCH* has been appointed junior maintenance engineer at the Middletown plants. He is a graduate of Iowa State College.

EDD COGAN has been promoted to the position of production cost analyst. He joined Gardner as a mail boy in 1934. *HERMAN FIEDLER,* who joined the firm in 1912 as a machinist in the maintenance department, has been promoted to foreman of the Lockland skid shop.

Libby Leaves Syracuse; Gets N. Carolina Post

PROF. CLARENCE EARL LIBBY has resigned as head of the pulp and paper manufacture curriculum in the New York State College of Forestry at Syracuse, a position which he had held since 1920. Prof. Libby has been appointed head of the pulp and paper technology program at the School of Forestry, North Carolina State College, Raleigh.

Nationally famous for his researches, teachings and writings, he will direct an enlarged program of instruction and research at North Carolina designed to advance the expansion of the industry in the Southeast.

Professor Libby received wide acclaim two years ago on completion of research work leading to the successful commercial technique of making quality mechanical pulp from northeastern hardwoods under a process known as "Chemigroundwood." During the First World War he did cellulose research for munitions manufacturers. Prof. Libby also was instrumental in the construction in 1937 of a forestry laboratory at Syracuse that contains semiplant-scale pulping equipment for mechanical, chemical, and

semichemical pulps and actual plant-scale beaters, refiners, and a combination fourdrinier-cylinder paper machine. His department is credited with commercial research into making insulating board from southern pine. This work led the Johns-Manville Co. to build their mill at Jarrett, Va.

He is the author of scores of publications on phases of forestry and manufacturing in that field. In announcing Professor Libby's resignation, Dr. Hardy L. Shirley, acting dean of the College of Forestry at Syracuse, declared: "The College owes a deep debt of gratitude to Earl Libby . . . The Pulp and Paper Department as it now exists at the College is largely the result of his guidance and leadership . . . he realized that success in pulp and paper technology must be based primarily on an intimate understanding of the chemical and engineering phases of pulp manufacture. The curriculum he has built up is famous throughout our nation and throughout the world as one of the outstanding preparations for men entering the paper industry."

C. E. Libby

T. R. Stein

Rayonier Appoints Stein Doctortown Resident Manager

The appointment of *THOMAS REBER STEIN* as resident manager of Rayonier Inc.'s new $25,000,000 purified wood cellulose plant currently under construction at Doctortown, Ga., has been announced by the firm.

A native of Sunbury, Pa., and a graduate of Bucknell University, Mr. Stein has been closely associated with the cellulose industry since 1937. He was formerly resident manager for Minnesota & Ontario Paper Co. Before joining Rayonier, he served as assistant manager in charge of engineering and construction for Wood Conversion Co., Cloquet, Minn. At one time he was an engineer in the Turbine and Compressor Division of General Electric Co., Syracuse, N. Y.

New Members Added to Strathmore 25-Year Club

The Strathmore Paper Co., West Springfield, Mass., honored the 210 members of its 25-Year Club at a banquet recently.

New members of the club this year are: *ERNEST COLLINS, A. FRANK BARBIERI, ROMAN ZIEBA, HOWARD F. KING, EDGAR R. MacDONALD, ALBERT IRWIN, KENNETH E. FALES, ARTHUR A. FERRERO, STANLEY PROVO* and *ROBERT A. BAGG.*

A gold watch was presented to *JOHN D. NAYLOR*, veteran employee who has 50 years of continuous service with the company. Gold 25-year service pins were presented to all employees who had just completed their 25 years of service.

CHARLES M. KOON has taken over supervision of the technical service department of Oxford Paper Co. at Rumford, Maine. A graduate of the New York State College of Forestry, he was for six years a research assistant at the Institute of Paper Chemistry in Appleton, Wis. Mr. Koon has also been associated with Champion Paper & Fibre Co. in Canton, N.C., and Munising Paper Co., Munising, Mich. For the past 2½ years he has been acting chief of the Pulp, Paper and Timber Section of ECA in Paris.

Great Lakes Paper Co. has reported the promotion of *C. A. MICHELS* to vice president in charge of production and operations and that of *CLARE MAPLEDORAM* to public and industrial relations manager. Mr. Michels was formerly general superintendent of the Fort William mill, while Mr. Mapledoram has been personnel manager at Fort William.

L. G. GLAZER has been elected executive vice president of Hollingsworth & Whitney Co., Boston. *W. ELLIOTT PRATT JR.* was named vice president and treasurer; *FREDERICK GOODRIDGE*, vice president; *JACK B. COWLE*, vice president in charge of sales, and *CHARLES J. DYNES*, assistant vice president.

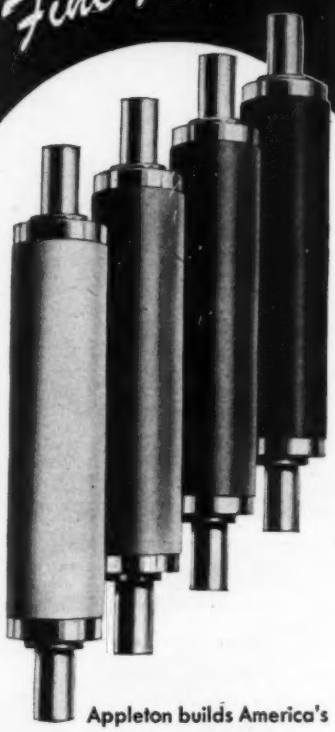
At the recent annual meetings of the stockholders and board of directors of Bemis Bros. Bag Co. *C. W. LOOMIS*, vice president and director of personnel, was elected to the board; *F. V. DEADERICK*, eastern director of sales, was named a vice president.

ALBERT O. DYSON has been named manager of the Pulp & Paper Division of Nichols Engineering & Research Corp., New York, N.Y. He succeeds H. E. Ingalls, who will now represent the firm in the states of Maine, New Hampshire and Vermont. Previous to joining Nichols in 1948, Mr. Dyson was with American Writing Paper Corp., Holyoke, Mass.

G. J. TICOULAT, who has been serving the National Production Authority

APPLETON SUPER-CALENDER ROLLS . . .

First Choice for Fine Finishes!



Appleton builds America's finest finishing rolls — available in a complete range of sizes and fillings to meet every finishing requirement.

THE APPLETON MACHINE CO.
APPLETON, WISCONSIN

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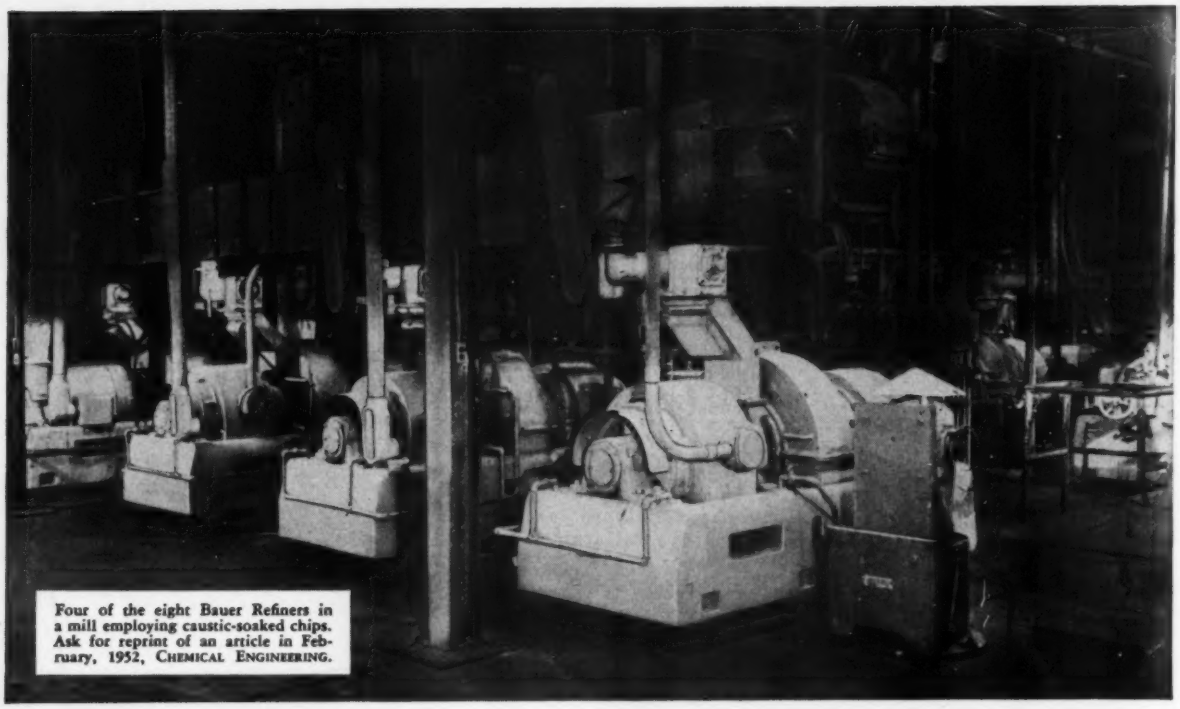
APPLETON SUPERCALENDERS *Speak for themselves*

Yes, modern *Supercalenders* made by the *Appleton Machine Company* speak for themselves. Wherever better paper is being produced, *Appleton Supercalenders* prove they are "America's Finest." Find out about their tested superiority. Write today for technical data on *Appleton Supercalenders!*

Sales	Castle and Overton, Inc., New York
Representatives	Pacific Coast Supply Co., San Francisco and Portland

APPLETON MACHINE COMPANY
APPLETON WISCONSIN

CUSTOM-BUILDERS OF PULP & PAPER MILL MACHINES • WINDERS • ROBERTS GRINDERS • FINISHING ROLLS • REWINDERS



Four of the eight Bauer Refiners in a mill employing caustic-soaked chips. Ask for reprint of an article in February, 1952, CHEMICAL ENGINEERING.

Actions speak for Bauer Disk Refiners

When end products and manufacturing costs are compared, the evidence wins the case for disk refining. The proof of actual performance accounts for the increasing usage of Bauer Disk Refiners.

These machines produce unique fiberizing and dispersing results through brushing and rolling manipulations combined with vigorous agitation and turbulence. The effects are seen in final paper or board of improved appearance and greater strength.

The materials being processed with Bauer Disk Refiners include raw, steamed and semi-chemically-cooked chips; groundwood; knotter and screen rejects; waste paper stocks; bagasse; rags; straw, and various other agricultural residues.

The foregoing materials are fabricated into tissues; book, bond, and bag papers; newsprint, wrappers, all types of container board, insulating and building boards, roofing felts, etc.

We'll be glad to show you mill samples as evidence of the work done by Bauer Disk Refiners. In case you wish to try new materials, our research laboratory is at your service for test runs on commercial machines.

You are invited to communicate with us or confer with our sales engineers.

THE BAUER BROS. CO.

1759 Sheridan Ave., Springfield, Ohio

Established 1878

Bauer

and Defense Production Administration in Washington, D.C., for the past 14 months, has returned to duty with Crown Zellerbach Corp. as vice president. Mr. Ticoulat went to Washington as director of the Pulp, Paper and Paperboard Division of NPA, served later as deputy assistant administrator of the Chemical, Rubber and Forest Products Bureau of NPA, and some months ago was made deputy administrator for DPA.

THOMAS G. ZENTNER has been appointed mill technician in the technical department of Gardner Board & Carton Co., Middletown and Lockland, Ohio. He holds a doctor's degree from the Institute of Paper Chemistry, Appleton, Wis.

BRUCE FEULNER has been made assistant superintendent of the mill finishing division of Hammermill Paper Co., Erie, Pa. He succeeds Adrian L. Kennedy, who became superintendent of the division July 1. Mr. Feulner has been with the firm in the finishing division since 1933.

HAMILTON K. PYLES has assumed his duties as assistant regional forester for the north central U.S. Forest Service region. He is assistant to J. H. Price, regional forester, and is in charge of information and education. Mr. Pyles' headquarters is Milwaukee.

G. A. HERMANN has resigned as president of Hermann Mfg. Co., Lancaster, Ohio, to become vice president and sales manager. He will devote his entire time to the promotion, sales, and service of the Claflin continuous beater and refiner in conjunction with Emerson Mfg. Co., Lawrence, Mass., sales agent in the United States and Canada for the refiner. Succeeding Mr. Hermann is *A. E. HOLTON*, president of Essex Wire Corp., Detroit. Essex purchased the Hermann Co. in 1951.

IRA D. WALLACH has rejoined Gottesman & Co. Inc., wood pulp and chemical merchants, as vice president. He recently resigned as executive vice president of Eastern Corp., Bangor, Maine, where he had been serving temporarily as chief executive officer pending the selection of Harold Holden as president a few weeks ago.

C. E. DOWNHAM, project engineer for Marinette Paper Co., Marinette, Wis., has been promoted to the position of assistant paper mill superintendent.

E. B. HINMAN of the Three Rivers, Que., plant of Canadian International Paper Co has been transferred to the Dalhousie, N. B., plant of New Brunswick International Paper Co. as acting assistant manager. He was formerly assistant plant superintendent at Dalhousie. *C. F. WALKER*, for the past two years general plant superintendent at Dalhousie, has been transferred to Three Rivers as general superintendent.

OUTSTANDING INDUSTRIALIST AWARD is presented to William J. Alford III (right), president of Alford Cartons, Ridgefield Park, N. J., by Dr. Walter D. Head, president of Bergen Junior College, Teaneck, N. J.; the school, which makes the award annually, chose Mr. Alford because of his pioneering in the development of modern packaging methods

Ontario-Minnesota Pulp & Paper Co. Ltd. has announced the following appointments: *GEORGE A. POTTS*, woods production manager for logging operations; *C. W. ROARK*, general woods superintendent for the Kenora Division, and *S. N. GOLDER*, general woods superintendent for the Fort Frances Division.

Champion Paper & Fibre Co. announces three promotions affecting the Hamilton (Ohio) Division. *W. A. TAYLOR* has been made general superintendent of the coating mill. *LEO J. ROSE* was appointed assistant general superintendent, and *WILLIAM VANOVER* was promoted to night superintendent of the coating mill.

Newly elected members of the Controllers Institute include *IRVING C. BARNES*, Strathmore Paper Co.; *H. JOHNSTON BURNS*, Powell River Co. Ltd.; *GEORGE J. C. HODSON*, Pacific Mills Ltd.; *PAUL F. COOPER*, Stocker Mfg. Co., and *CHARLES S. CORWIN*, Oxford-Miami Paper Co.

A. E. Staley Mfg. Co., Decatur, Ill., has announced the appointment of two sales representatives. *WENDELL RAY*, formerly price and market analyst, has been assigned to the Philadelphia office. *CLINT A. PICKETT*, formerly with G & D Mfg. Co., Streator, has been assigned to the Chicago office.

RAYMOND E. STEFFEN has been appointed personnel manager for Ketchikan Pulp Co., Ketchikan, Alaska. He formerly was employed by Matson Navigation Co. in California.

JOHN G. BROUGHTON JR. has joined the Organic Chemicals Division of Dewey & Almy Chemical Co. as a salesman. He will sell copolymer latices to the paint, paper and textile industries.

Jackson & Church Co., Saginaw, Mich., has announced two new executive positions in its engineering department. Named as director of engineering was *FRANCIS W. HOYE*, former head of mechanical engineering at Syracuse University. *DR. HAROLD E. GRAVES* in charge of chemical engineering at the University of Rhode Island, will direct chemical engineering.

EDWARD R. BRYAN has been elected treasurer of Walker-Goulard-Plehn Co. At the same time, *FRANKLIN H. McLEAN* was made assistant treasurer.

ALLEN LATHAM JR. has been made a vice president of Arthur D. Little Inc., consulting research and engineering firm of Cambridge, Mass. He will continue as

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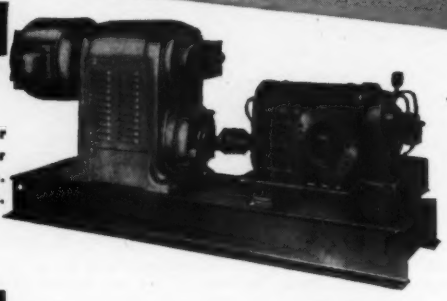
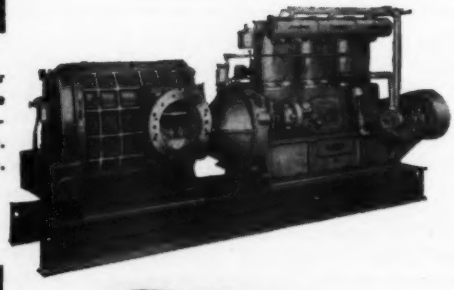
Standardaire Blower with Varidrive Motor to deliver 780 c. f. m. at 1750 r. p. m.



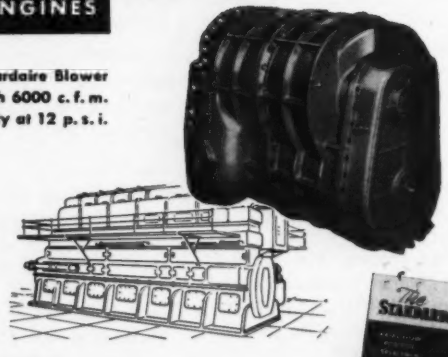
for SEWAGE PLANTS

Standardaire Blower with Climax Engine using sewage gas—to deliver 2100 c. f. m. at 720 r. p. m.



for DIESEL ENGINES

Standardaire Blower with 6000 c. f. m. capacity at 12 p. s. i.



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BLOWER-STOKER DIVISION

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director of the Mechanical Division, in addition to his responsibility for overall operation. At the same time, *LEROY F. MAREK* was named to the board of directors and will have charge of technical operations.

GEORGE T. JUBB, president of Kalamazoo Paper Co., has requested to be relieved of some of the responsibilities of management, with a view to his full retirement at the end of this year. As a result, *JAMES A. WISE*, vice president for production, was advanced to executive vice president and general manager, and *JAMES M. CAUSEY*, in charge of sales for the past 10 years, was named vice president for sales.

J. A. Wise

J. M. Causey

Bridgeport Brass Co. has appointed *CHESTER M. ADAMS* as general sales manager for all products. *GEORGE H. BALDWIN*, formerly sales manager for mill products, is now assistant general sales manager, and *RICHARD L. ALLEN* has been named sales manager for mill products for both the Bridgeport, Conn., and Indianapolis plants.

Bailey Meter Co., Cleveland, announces the appointment of *W. POWELL JR.* as manager of the Buffalo, N.Y., branch office.

W. Powell Jr.

V. D. Knight

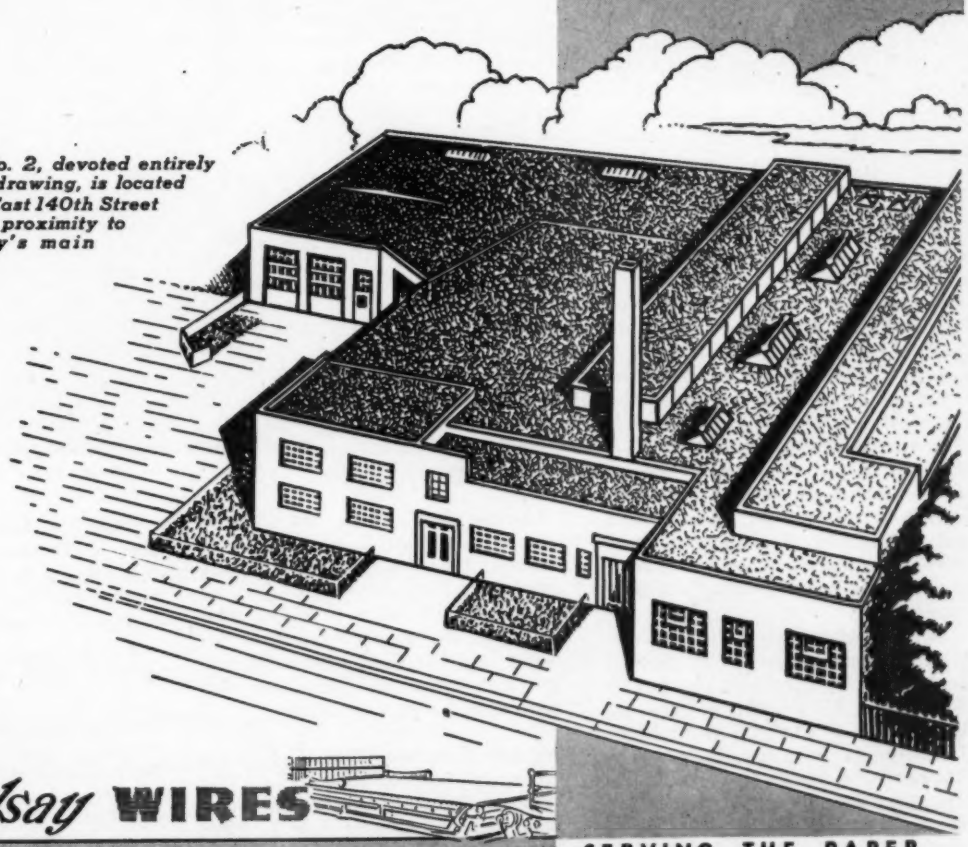
VERNON D. KNIGHT has been named to represent Eastwood-Nealley Corp. in the southern states. For many years Mr. Knight has been an administrative assistant of International Paper Co.'s Southern Kraft Division at Mobile, Ala.

WILFRED J. DESJARDIN of Kimberly-Clark Corp., Niagara Falls, N.Y., has been elected to the board of directors of the Western New York Safety Conference.

Another *Lindsay* PLANT

COMPLETELY INTEGRATED FOR WIRE DRAWING

The quality of Lindsay Fourdrinier wires is still further assured. Wire drawing has become a completely integrated operation in Plant No. 2, laid out and specifically equipped for this single purpose. Thus the growth suggested at the left continues, but with unremitting reference to excellence and uniformity of product. The Lindsay Wire Weaving Company.



Plant No. 2, devoted entirely to wire drawing, is located at 835 East 140th Street in close proximity to Lindsay's main plant.

Lindsay **WIRES**

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CLEVELAND 10, OHIO

The Paper Industry Necrology

Frank J. Sensenbrenner

Industrial leader and of wide fame in the paper industry, *Frank J. Sensenbrenner,* former president of Kimberly-Clark Corp. died July 22 in Neenah, Wis. He was 87.

Known as the "grand old man" of the industry, Mr. Sensenbrenner had served K-C 62 years. After joining the firm in 1889 as a bookkeeper, he rose rapidly through a series of executive posts, becoming president in 1928 on the death of J. A. Kimberly, one of the founders and first president. After 14 years as president, Mr. Sensenbrenner retired in 1942, at which time he was named chairman of the board, a post he relinquished in 1944. He remained a director of the firm until his death.

F. J. Sensenbrenner

A past president of the American Pulp & Paper Association, Mr. Sensenbrenner was also a director of International Cellucotton Products Co. of Chicago, a member of the executive committee of Northwestern Mutual Life Insurance Co., and a director of several banks. A member of the board of regents of the University of Wisconsin, he was also on the board of governors of Marquette University, a trustee of Lawrence College in Appleton, and a member of the lay advisory committee of St. Norbert College, West De Pere. Mr. Sensenbrenner was a Knight of St. Gregory and had served as a member of the finance committee of the Republican Party of Wisconsin.

Among educational and political leaders paying tribute to Mr. Sensenbrenner at the time of his death were Gov. Kohler; E. B. Fred, president of the University of Wisconsin; Father Edward J. O'Donnell, president of Marquette; Thomas E. Coleman, Madison industrialist and Republican Party leader, and Henry Ringling of Baraboo, newly elected Republican national committeeman.

Constant Southworth

Constant Southworth of Springfield, Mass., president and treasurer of Hampshire Paper Co., Inc., of this city, died of a heart attack at his summer home in Blandford on July 8. He was 56.

Mr. Southworth was also a director of Southworth Paper Co., West Springfield, Mass., which was founded by his grandfather, Edward Southworth, in 1839, and president and treasurer of Hampshire Realty Co. of South Hadley. He was head of Hampshire Paper Co. of South Hadley Falls for many years, before it was sold to Stevens Paper Co.

Gordon MacIntyre

For many years, consulting engineer for St. Regis Paper Co. and other paper industries in Canada and the United States, *Gordon MacIntyre,* 64, died July 1.

His business interests included Benmont Papers, Inc., Bennington, Vt., Sherman Paper Products, Newton, Mass., Forest Products Laboratory, Montreal, and A. E. Staley Mfg. Co., Decatur, Ill. He was a native of New Brunswick.

Frank Metzger

Frank Metzger, paper mill superintendent of the Port Arthur Division of Provincial Paper, Ltd., Toronto, died recently following a brief illness. He was 55.

Mr. Metzger joined Provincial in 1930 and served as night superintendent for 12 years, later becoming assistant to the paper mill superintendent at Port Arthur. In 1946 he was appointed paper mill superintendent.

Lammot du Pont, 71, one of three brothers who built E. I. du Pont de Nemours & Co. into one of the world's great chemical companies, died July 24. Mr. du Pont, a native of Wilmington, Del., was the eighth member of his family and the third brother in succession to head the firm that was founded by his great-grandfather.

Harry B. Jackson, 80, head of the art department of Consolidated Paper Co., Monroe, Mich., until his retirement in 1940, died at his home June 3. Since leaving Consolidated, he had done freelance art work.

Associated with the paper industry in Pittsburgh for nearly 50 years, *Finley T. Jamison,* 80, died at his home in suburban Mt. Lebanon May 31. In 1939 he was named head of the National Paper Trade Association.

Rudolph H. Durnell, president of Phillip Rudolph & Son Inc., makers of paper boxboard and lining, died May 21 at his home in Philadelphia.

Earl F. Johnson, 63, a vice president of Inland Container Corp. and general sales manager of its Johnson Box Division, Milwaukee, died unexpectedly June 2. He founded Johnson Box in 1933; in 1937 it became a division of Inland.

Ralph E. Skinner, 57, one-time secretary of Harmon Paper Co., Brownsville, N. Y., and of Warren Parchment Co., Dexter, died in Watertown June 6. He had also served for a time as a paper broker for Great Northern Paper Co. and St. Regis Paper Co.

William J. Zeeland, a service engineer with Bird Machine Co. for many years, died recently. He had been associated with Bird since 1921.

Edward F. Herrlinger, 87, chairman of the board of Gummed Products Co., Troy, Ohio, and a former president of the National Paper Trade Association, died July 20 at his home in a Cincinnati suburb.

Louis Sherman, 68, treasurer of Farnsworth Corp. and Sherman-Feinberg Corp., Boston, Mass., manufacturers of fibre products, died June 23 at Boston.

Chairman of the board of directors of United States Corrugated Fibre Box Co., Indianapolis, Ind., *Howard J. Lacy,* 77, died June 26. He founded the box company in Indianapolis in 1912 and served as president until 1942, when he resigned to become board chairman.

Chester A. Saybolt, 68, retired president of Lockwood Folding Box Co., Philadelphia, Pa., died at his home in Pitman, Pa., July 8.

Charles Lombard Beckwith, 71, president of Carter Paper Co., Springfield, Mass., died at Springfield July 6. Mr. Beckwith had been with Carter Co. for 54 years, beginning as a clerk in 1896. He was made president of the company in 1922.

Vice president in charge of sales of Lockport Felt Co., Newfane, N. Y., *Bertram A. Audley,* 63, died at his home on June 22, after an illness of several months. He joined the company 32 years ago as a bookkeeper.

How the stock is put on your wire makes tremendous differences in your sheet qualities. With a non-adjustable headbox your superintendent's hands are tied. He needs complete flexibility at this vital point to turn out consistent QUALITY!

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The Paper Industry Safety News

Hudson's Palatka Div. Receives Award

A special award has been presented to the Palatka, Fla., kraft mill of Hudson Pulp & Paper Corp. by the American Mutual Liability Insurance Co. The presentation was made in recognition of the 729,963 man-hours worked during 1951 without a lost-time accident. Resident Manager J. L. Richardson received the award for the company.

The award was made to the bag mills, under the supervision of J. S. George, superintendent; John Williamson, supervisor of the multiwall converting department, and Clarence Eastman, supervisor of the grocery bag department.

The Palatka operation is Hudson's largest kraft mill. It produces gummed sealing tape, of which it is the world's largest producer, multiwall sacks, grocery bags and sacks, butchers paper, kraft wrapping and jumbo rolls for numerous converters of kraft paper products. The safety supervisor is John Brett.

NSC Annual Reviews 1951 Accident Record

You could work five days a week for the next million years and not make up the time lost as a result of 1951's work accidents. The 280,000,000 man-days lost labor represent only one aspect of the economic loss from work accidents, according to "Accident Facts," the National Safety Council's statistical annual. Just off the press, the 1952 edition points out that the total cost in dollars of occupational injuries in 1951 reached the staggering total of $2,650,000,000.

Twenty-one pages of the 96-page book are devoted exclusively to occupational accidents and provide the fatcual background necessary to give an industrial safety program direction. Commonest sources of injury, the parts of the body most frequently injured, off-the-job problems, women in industry, and many other subjects are included.

In addition to the occupational section, detailed statistical information is provided on accidents of all types—motor vehicle, transportation, home, farm, and school. Single copies are obtainable from NSC, 425 North Michigan Ave., Chicago 11, at 75 cents apiece.

Printer-Slotter Dangers Outlined by NSC

The Pulp and Paper Section of the National Safety Council has recently released a data sheet pointing up the danger points in the use of a printer-slotter. Also included in the new publication are methods by which the mechanism may be properly guarded.

The five hazard points that cause the most serious injuries are (1) feed nip roll, (2) nips of the rolls that prepare and deliver the ink to the cylinder, (3) the slotting shafts, (4) the slitting and slotting knives, and (5) the kicker of flight bars.

The data sheet covers protection against these hazards, as well as preventive measures for many other hazards in the operation and maintenance of the unit—falls, strains, falling objects, and electrical shocks.

To help control these hazards, the data sheet gives consideration in some detail to five recommendations on equipment and protective devices. These recommendations are: (1) standard coverings for all gears, driving belts, pulleys, and motors; (2) brakes; (3) steps and catwalks equipped with handrails; (4) hinged screen guards over the slotter, and (5) safety catchers.

40th National Safety Congress and Exposition is to be held October 20-24 at the Conrad Hilton, Congress, Morrison, and Sheraton hotels, Chicago.

Insulite Division, Minnesota & Ontario Paper Co., International Falls, Minn., recently received the Employers Mutuals of Wisconsin plaque for its low accident frequency rate. The award was made by Minnesota's Gov. E. Elmer Anderson at the Annual Duluth Chamber of Commerce Safety Award Dinner. For winning the award for the third consecutive time, the division retains permanent possession. Its 2.9 rate was the lowest of the contestants in the pulp and paper section.

Rayonier Inc., Port Angeles, Wash., has received the Award of Merit from the National Safety Council in recognition of its outstanding safety record. The award was given for the 1,015,383 man-hours of

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operation between May 11, 1951, and February 27, 1952, without a disabling injury. During this period, the mill operated 292 consecutive days without a mishap causing loss of time from work for any employee, thereby establishing a record for company operation.

United Board & Carton Corp.'s
Thomson, N.Y., paper mill has won an award in the 27th Annual State-Wide Accident Prevention Campaign. Final figures showed the Thomson mill in fourth place in a group of 14 participants, with an average of 99.937 per cent.

25th Annual Maine State Safety Conference
is to be held at York Harbor Spetember 11 and 12. Each day of the meeting a pulp and paper panel session is scheduled. The gathering is to be at the Marshall House.

Kimberly-Clark Corp.'s
Kleenex Section at the Memphis mill has worked 1,958,735 safe man-hours and 1,602 consecutive safe days to set a new corporation record. It represents 4½ years without a disabling injury.

George W. Harper,
past general chairman of the NSC Pulp and Paper Section, has been named secretary for the committee on engineering of the President's Conference on Industrial Safety. Mr. Harper is associate professor of mechanical engineering at the University of Illinois.

E. B. Eddy Co.'s
Ottawa, Ont., mill has been presented the Ontario Pulp and Paper Makers' Safety Association accident prevention award for the second consecutive year. The presentation is made to the mill achieving the lowest accident rate among the 22 mills of its class.

C. C. MacPike,
safety director for St. Regis Paper Co., Pensacola, Fla., has been elected president of the Industrial Management Association.

Congoleum-Nairn Inc.'s
Cedarhurst, Md., plant set a new all-time plant safety record when on February 19 the best previous record of 1,083,818 man-hours was surpassed. On April 3 the plant completed two full years free of disabling injury.

The Millionth Man-Hour
of operation without a lost-time injury was passed June 14 by the Chemical Pulp Division of Buckeye Cotton Oil Co., Memphis. This is the fourth time in the last five years that the employees of the division have achieved the 1,000,000-man-hour mark.

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Foreign Abstracts . . . . . .

Printing ink vehicles under the microscope

When a drop of an ink vehicle is placed between two glass plates, which are then rapidly separated, a characteristic (dentritic) structure (**I**) results, depending on the viscosity of the oil. Photomicrographs are given. **I** indicates the "pull" exerted on a paper surface and, with experience, furnishes a means for predicting the tackiness of the ink. E.g., a "strong" linseed oil varnish which produces a uniform pattern in **I** would probably tear nearly any paper, due to extreme tackiness. Chr. Hostmann Steinberg Farbenfabriken (Celle, Germany). *Allg. Papier Rundschau,* 1952, 154-5. (In German).

Beech sulphite waste liquor

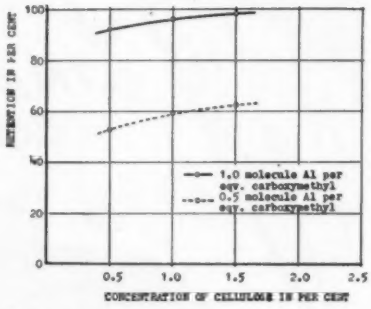
In the course of a study of the foam producing principle in beech sulphite waste liquor, the solution was extracted with ether, and also with ether-alcohol. The extracts yielded a product containing about 23-24 per cent methoxyl, and appeared to be a diaryldibutane derivative similar to conidendrin. The procedure of Lackey, Moyer and Hearon [*Tappi,* **32,** 469 (1949)] for precipitating conidendrin from coniferous sulphite waste liquors (using trichloroethylene or toluene) proved unsuccessful in the case of beech waste liquors, although the addition of 2 g./liter of kieselguhr helped in the coagulation of a crude product, which still requires further purification and study. T. Kleinert and Marietta Floriantschitsch. *Monatshefte,* **83,** 36 (1952). (In German).

Retention by wood pulp of carboxymethylcellulose

One of the applications of sodium carboxymethylcellulose ("CMC") is that of a beater additive; it enters the beater furnish together with alum, rosin size and other components. Inasmuch as a part of the CMC is lost with the white water, the present author investigated the magnitude of such losses, and he describes a series of experiments on the influence of various factors on the retention of CMC in the paper. These factors included freeness and concentration of the pulp, the degree of substitution (D.S.) of the CMC, the amount of alum added, and the time at which this alum was introduced into the beater.

The retention of the CMC was investigated by simple filtration experiments, and the amount of CMC leaving a pulp filter pad was determined by an analysis of the filtrate, in which it was analyzed by means of 2,7-dihydroxynaphthalene (cf. Eyler and Hall, *Paper Trade J.,* Oct. 9, 1947, p. 59). It was found that unless alum was added, practically no retention occurred, and that the retention was most satisfactory when the addition of alum *preceded* that of the CMC. A sample of CMC with a D.S. of 0.54 was retained better than one with a D.S. of 0.75.

Actually, the CMC with lower D.S. is inherently the less soluble and therefore requires less alum. For example the CMC with lower D.S. required only 4 per cent alum (based on oven-dry pulp) for 80 per cent retention, whereas the CMC of higher D.S. required 7 per cent alum to obtain this same result. Using proper amounts of alum (with addition prior to CMC) it was possible to obtain satisfactory retention with a pulp consistency of 0.45 per cent (and possibly lower). This is shown in the accompanying diagram, in which the retention even at low pulp consistencies, using 1 mole alum, was well over 90 per cent (and approached 100 per cent at a cellulose concentration of 1.5 per cent). In practical papermaking, with the author's data on hand, it should not be difficult to obtain an 80 per cent retention of CMC. Lennart Laurell. *Svensk Papperstidn.,* **55,** 366-369 (1952). (In English.)



Effect of concentration of cellulose and quantity of alum on the retention of CMC. Alum added before CMC, D.S. of CMC = 0.58

Experiments with a hydrafiner

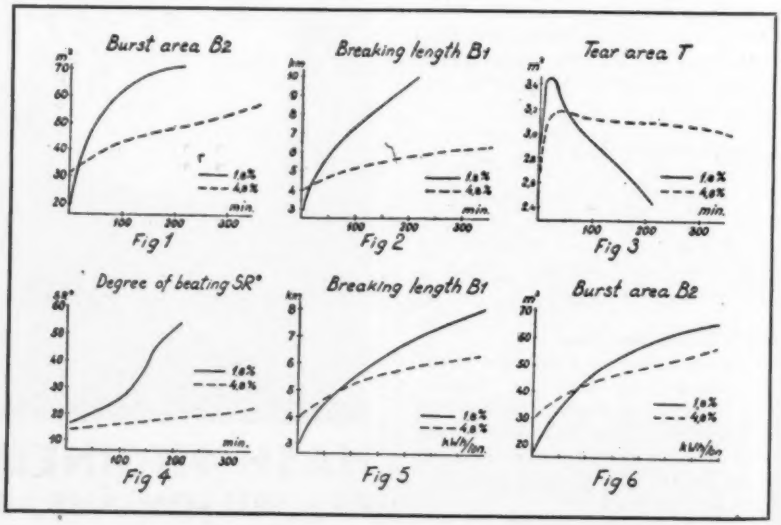
Beating experiments on a kraft pulp were carried out in Finland at the Valkeakoski Paper Mill (United Paper Mills, Ltd.) using a Tampella hydrafiner, size No. 1, details of which are given. The tests were made using the batch system with two different motor speeds.

In one instance, the number of revolutions of the 150 kw. motor was 1450, and the perpendicular clearance between the hydrafiner bars was 0.5 to 1.3 mm. at consistencies of 3 to 5 per cent. The effects of consistency and "throughput" were studied. At high consistencies the tearing strength rapidly reached its maximum and remained almost unchanged during the beating. Whereas the breaking length and burst improved all the time, this improvement was slow. It is evident (from Figs. 1 through 6) that lower consistencies (1.8 per cent) gave better results in breaking length and burst. The results are comparable to those obtained with Jordans. The beating effect could be increased by throttling the throughput, and strength tests improved.

By using a 980 rpm motor, and decreasing the bar-to-bar clearance to 0.18-0.22 mm., a very vigorous hydrafiner treatment was given, imparting good strength properties to the pulp, with a comparatively favorable power consumption. When higher pulp consistencies were used (with the 980 rpm motor) a centrifugal pump was connected to the inlet end of the hydrafiner in order to insure a sufficient head of elevation. Variations in the throughput (700 liters per min. versus 5000 liters/min.) showed no appreciable effect (when strength properties were plotted versus power consumption). Desired strength properties could be obtained by changing stock consistency. Ten references. Erkki K. Tolvi. *Svensk Papperstidn.,* **55,** 316-20 (1952). (In English).

Comparative testing of the mortars used in digester linings

The author reports the results of experiments for determining the acid resistance, swelling properties and adhesiveness of the following commercial products: *Höchst sodium silicate* cement, "SWD-2" (**I**); a Norwegian "Welhaven" cement (**II**) containing sodium silicate and litharge; the synthetic *"Asplit A"* resin cement without (**IIIa**) and with (**IIIb**) subsequent hard-



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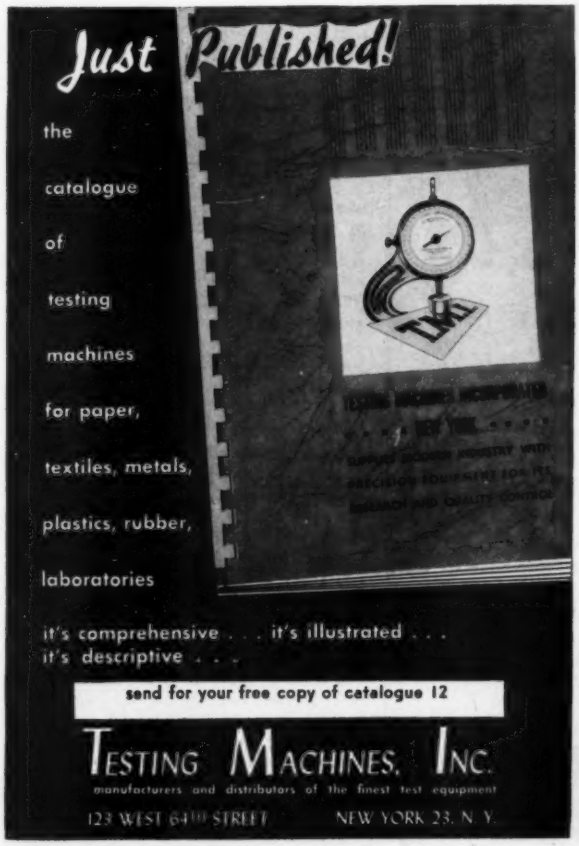


Here's where a piping contractor has to mind his P's and Q's

Probably we should say L's and T's!

Anyway, the labor cost on a big job like this could exceed the estimate if the men lost time with badly threaded fittings . . . couldn't run 'em up to make tight joints . . . broke 'em when applying the heave-ho.

And then, if the joints seeped or the fittings themselves leaked under pressure, the contractor would lose money on call-backs and make-goods.

Not so on this job! The contractor selected "K" Fittings. He knows by experience that the threads are tapped full and clean . . . that the walls are uniformly thick . . . that the bodies are sound, close-grained, and with much higher than standard tensile strength.

It's smart to get fittings from a distributor who handles the Kuhns line—the precision-made fittings identified by the "K" trade-mark.

K CAST-IRON FITTINGS
3000 SHAPES AND SIZES

THE KUHNS BROTHERS COMPANY
Dayton 1, Ohio
Established 1887

ening; and a synthetic resin *"Plania"* without **(IVa)** and with **(IVb)** later hardening. In either case, this hardening induces further accelerated polymerization of the resin components in **IIIb** and **IV**. Two test rectangular blocks each, of the six mortars, were formed. This preparation, the testing methods and the exposure schedules are fully described.

One block was kept as control in an air-conditioned laboratory; the other was inserted into a perforated acid-resistant steel sleeve, which was then hung in a suitable basket **(V)**, screwed close to the wall within the digester in which the tests were carried out. Thus, **I, II, IIIa, IIIb, IVa** and **IVb** blocks were all exposed under identical operating conditions to a total of 129 sulphite cooks. The test period was 162 days, but at stated intervals the samples were removed, measured, weighed and returned to **V** and to the digester. The exposures under conditions of the experiments resulted in accelerated reaction rates because the samples were in closer contact with the cooking liquor than are the mortars actually used in digester linings.

I and **II** were not sufficiently acid-resistant. **IIIa** and **IIIb** showed marked swelling and shrinkage behavior which was less pronounced in **IIIb** than in **IIIa**. The best results were obtained with **IVa** and **IVb**, which showed good density and regular swelling properties, with very slight shrinkage and no fracture and were therefore well adapted to linings with elastic and temperature-resistant carbon bricks. "Hardening" proved beneficial. 20 illustrations. Rudolf Haas. *Das Papier*, **6**, 34-73 (1952). (In German).

Chippers

Two papers are included. One of these includes a mathematical analysis of chipper operation (with multiple knives). The following equation is given for calculating the chipping capacity [Q].

$$Q = [60KnZ(\pi d_1^2/4)l_c\Phi$$

cubic meters per hour]

Here K = number of knives that are simultaneously in contact with the billet of wood; n is the number of revolutions of the disc per minute; Z is the number of knives in the disc; d_1 is the diameter of the log; h is the depth of cut of the knives; Φ is the coefficient of feeding; and l_c is the chip length.

In the other paper the author found that in actual chipping practice chipping capacity is proportional to the square of the diameter of the log and that the chipping force is linearly proportional to the width of the chipper. An increased angle of grinding of the knives (and dull knives) results in augmented power consumption. Increased chip thickness and chipping with wet logs reduces power consumption.

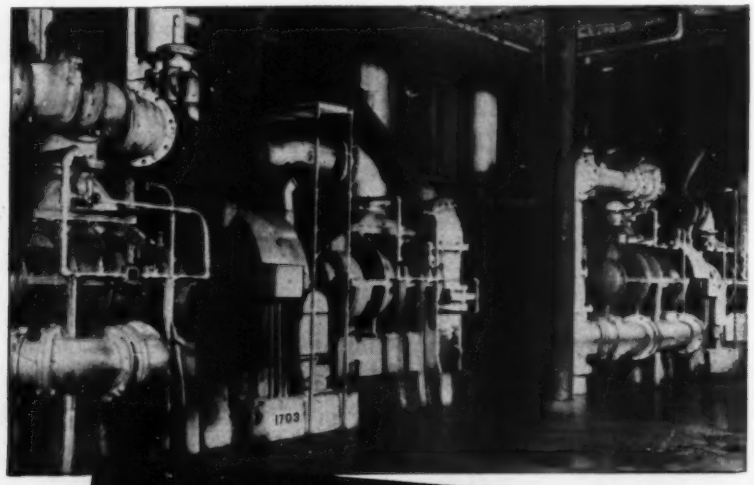
The average percentage of "fines" (passing a 5 x 5 mm. screen) produced in the average chipper usually amounted to approximately 5 per cent (with 2.5-3 per cent for very sharp, and 6-7.5 per cent for dull knives or for frozen wood). The average percentage of oversized chips (retained on a 35 x 35 mm. screen) was about 7-10 per cent by weight. N. M. Val'schchikov. *Bumazh Prom (The Paper Ind., U.S.S.R.)*, **25,** No. 4, 12-16 (July, Aug., 1950); No. 5, 15-19 (Sept., Oct., 1950). [In Russian, through *Bull. Inst. Paper Chem.*, **22,** No. 7, 500 (1952).]

Moisture determinations in pulp bales

Studies were made with groundwood, and wet and dry chemical pulps with "wedge", "diagonal" and "diagonal-axis" methods used in sampling. Water determinations were made and the results were compared with the actual moisture content of the bales from which the samples had been taken. The author concludes that whereas all three methods give results deviating from the "true value," they still fall within the ±0.5 per cent limits of permitted tolerances. The techniques are fully described, and the methods now employed are discussed. P. Padé. *Bull. assoc. tech. ind. papetiere*, **5,** 392-400 (1951). (In French).

The pH of papers

The author showed that ordinarily the pH of a stock suspension in the head-box **(I)** of the paper machine is lower than that of the water below the wire. After exploring the TAPPI standard methods for determining pH of various papers (both at room temperature and on heating), it was concluded that the "cold" method invariably gives values that are 0.6 to 1.6 units too high, and that the pH of the



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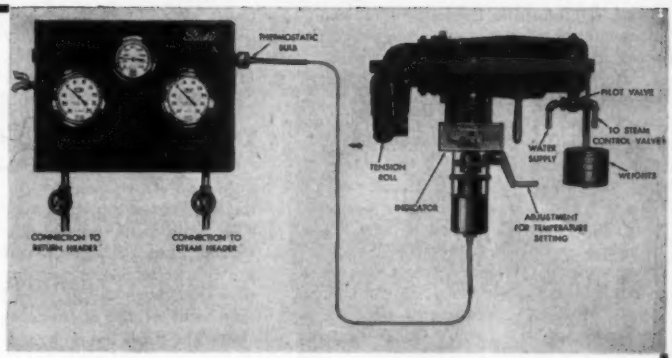

Moisture content of paper *cannot* be successfully set by guess and by gosh. But Stickle can set it for you—automatically—and maintain it throughout your operations *at the most profitable level for you.* Applied to your driers, Stickle Automatic Tension and Thermal Control *accurately* controls sheet moisture within one-half of 1%—actually permits 2% *more* moisture content than normal.

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paper, determined in hot suspensions, while frequently nearly the same as the pH of the water in **I,** are also somewhat erratic.

After a series of orienting experiments, the following procedure was suggested (for the French Technical Association of the Paper Industry "L'ATIP") which gives values agreeing fairly well with those of the suspension in **I.** The paper sample (1 g.) cut into 1 $cm.^2$ squares is moistened with 20 cc. water, and 50 cc. water containing 5 grams sodium chloride are added. The mixture is shaken thoroughly and then left 1 hour at 20 deg.; the pH in the *unfiltered* suspension is measured with a suitable pH meter. The reproducibility is usually of the order of 0.1 pH. Attempts to "neutralize" the acidity of paper suspensions by titration with 0.01 *N* aqueous sodium hydroxide proved to be very difficult. J. Vilars. (Papeteries Darblay, France) *Papeterie,* **74,** 213; 215 (1952). (In French).

The K. K. B. galvanic size tester

This work was done at the Norwegian Pulp and Paper Research Institute, where the KKB size tester was examined critically. The instrument (made by Kelvin and Hughes, Ltd., Glasgow) is described and a literature review of previous studies with this size tester is given. Advantages and drawbacks of the instrument are discussed fully. The KKB technique is compared with that of the ink flotation method (which is still used to a certain extent in Norway). Although a correlation exists between these two methods, there are frequent (and often systematic) anomalies. Both the KKB and the contact angle methods are influenced very similarly by the structure of the paper sheet. Discrepancies occurred when determinations were made with papers containing varying amounts of alum.

Despite its various drawbacks, the KBB tester should be found suitable for plant control work. This is true despite errors which creep in when measuring papers that contain large amounts of salts. When the instrument is used, however, the data obtained should always be subjected to critical evaluation. Fifteen references. A. P. Arlov. *Norsk Skogindustri,* **6,** 96-101 (1952). (In Norwegian, with English summary).

Water storage of unpeeled sprucewood

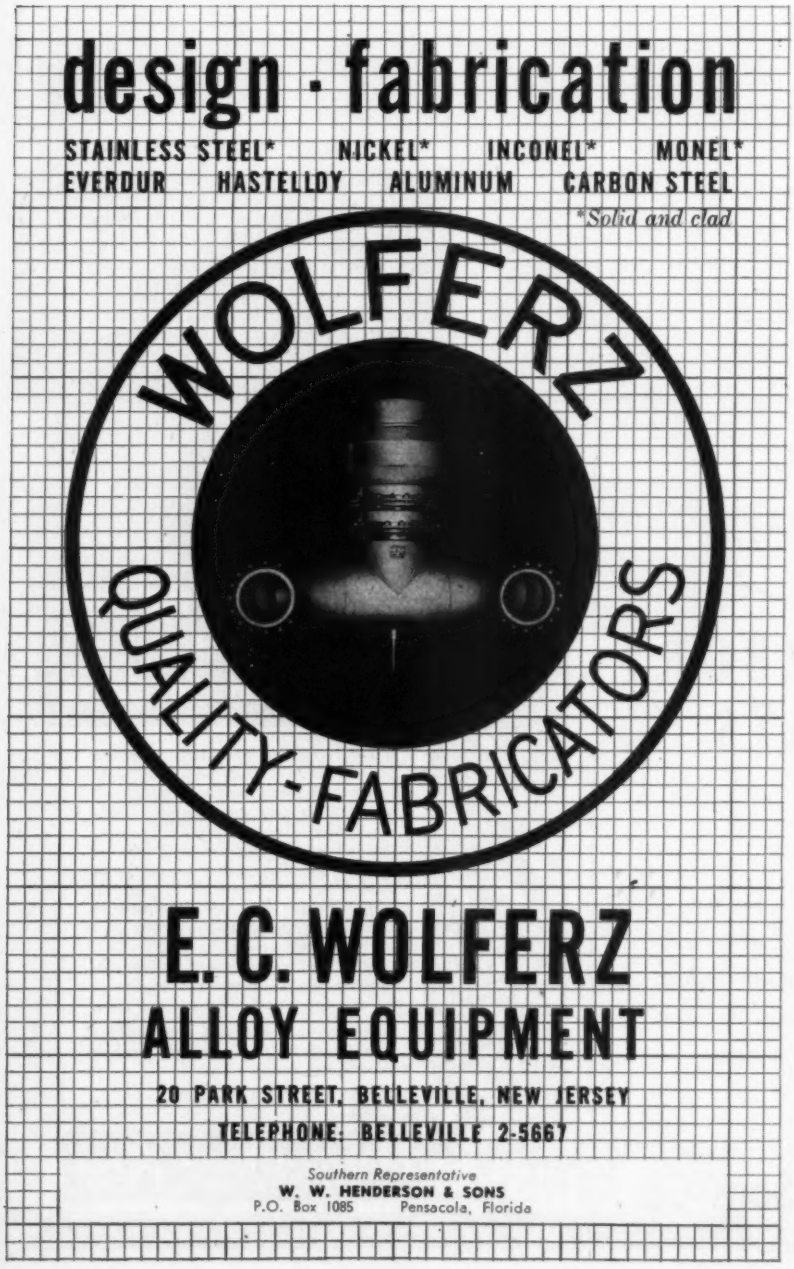
When unpeeled (or partially peeled) spruce is floated or stored in water over a long period, often the outer sapwood layer is resistant to sulphite pulping. This layer then gives a distinct violet color reaction with a solution containing 1 volume sulphuric acid and 4 volumes methanol. Evidently, the amount of "damage" is correlated with the temperature of the water and the time of water storage.

Grinding experiments were made on three different wood samples. A (which had been in water for 3 years) was badly damaged. B was sound wood. C contained logs that were only slightly damaged. The damaged portions of the cut surfaces of the logs gave the methanolic acid color reaction. In A about 20 per cent of the wood volume had been injured. Sulphite cooks with A, B, and C showed (in the yield figures) that A had been seriously damaged.

On the other hand, when strength properties, brightness and reflectance for the visible spectrum were made on the pulps, there was no significant difference between the pulp from A, B or C. The influence of ultraviolet light and storage on the various pulps was also studied. The pulp from A did not yellow any faster than did that from B. T. Holte. *Norsk Skogindustri,* **6,** No. 5, 126-133 (1952). (In Norwegian, with brief English summary.)

Paper pulps from the castor oil plant

This is the second of a series of papers on indigenous cellulosic raw materials of India which may prove useful in the production of pulp for paper and board. The pulping properties, both of the annual castor plant and the perennial tree form, were subjected to the kraft and soda processes; and the authors found that easy bleaching pulps could be produced by either method, although the sulphate process seems more suitable. Strength properties of the pulp were adequate. The stems of either variety may be used without the removal of bark. Pulps from the bark are long fibered, but the wood gives shorter fibers. The pulp from the wood can be mixed with bamboo or sabai grass pulps in the production of writing papers and printing papers. R. V. Bhat and N. S. Jaspal. *Indian Forester,* **77,** No. 7, 450-63 (1951). (In English).



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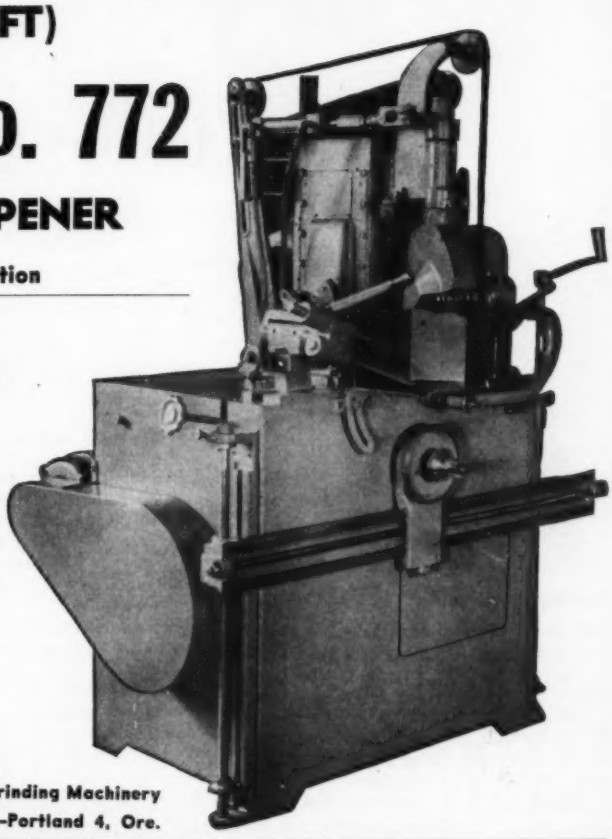

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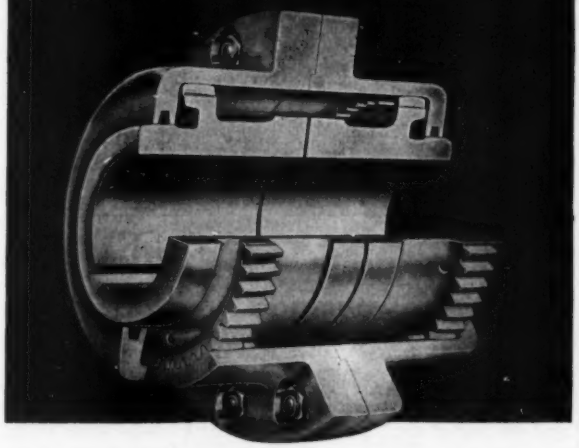

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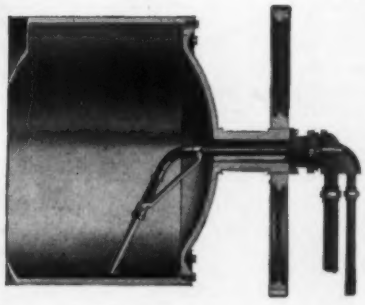

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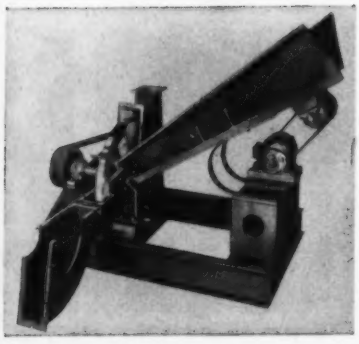


Rechipper

A new rechipper that produces chips of quality comparable to that of a large chipper, yet requires less horsepower than other types of chip reject processing equipment of the same capacity, is now on the market. It holds sawdust to a minimum, and when a blower is used, there is no need for a chip conveyor on the machine.

The design of the vibrating spout causes slivers to lie lengthwise; slivers are cut crosswise. Its capacity is 300 to 400 cu. ft. per hour with ½ in. chips and vibrating feeder; 600 to 700 cu. ft. per hour with stationary inlet. Drive is either V-belted or direct connected to 15 h.p. motor. The disc, made of hot roll steel, will accommodate six knives, mounted in seats recessed into the disc. Over-all height is 5 ft. 9 in., length 7 ft. 6¼ in., and width 3 ft. 5¾ in., without motor. *D. J. Murray Mfg. Co., Wausau, Wis.*

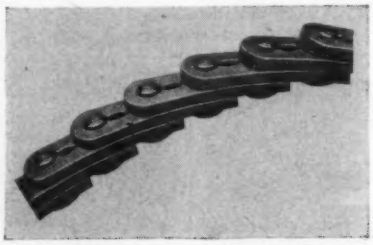
Motors

A new line of fractional horsepower motors, designated as "Form G," embodies an entirely new concept of motor design and manufacture.

The Form G motor is claimed to weigh as much as 51 per cent less per horsepower than the models it replaces and is considerably smaller in size. At the same time, its versatility of application has been broadened and its appearance modernized. The advanced design incorporates a completely new insulation system, in addition to new bearings, lubrication system, ventilation, mountings, windings, end shields, terminal board, and leads.

With the improved bearings, lubrication, and insulation, the Form G general purpose sleeve-bearing motor offers a wider range of application and will eliminate, in many instances, the extra expense of special enclosures or ball bearings. It is the only motor of its type recommended for all-angle operation.

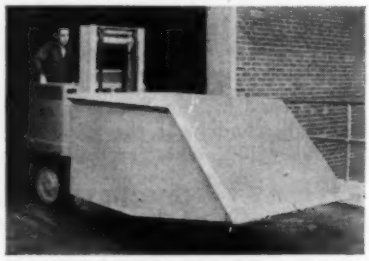
The motors are available in open drip-proof and totally enclosed fan-cooled models in Types K (polyphase), KC (capacitor start), KH (split phase), and KCP (permanent split capacitor) and conform fully to all NEMA specifications. *General Electric Co., Schenectady 5, N.Y.*



V-Link Belt

A new, patented, detachable V-link belt that is prestretched, will not slip, and can run in either direction has recently been introduced.

This V-link belt includes features that prevent distortion after usage and permit smooth vibration-free service at top speeds in either direction. The links are uniform in camber and dimension and are made from tough woven cloth impregnated with top grade heat and oil-resistant crude rubber. Another feature is the convex head, which assures greater strength and longer service. Non-slippage feature is due to high coefficient of friction and a perfected wedge action. *Brammer Co., 684 Broadway, New York 12, N.Y.*



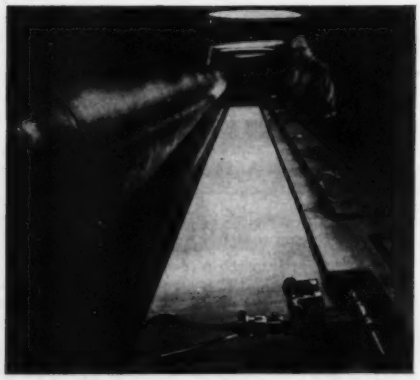
Electric Platform Truck

A new 4000-lb. capacity high-lift platform truck with an extra-large 80-cu. ft. end-dump hopper is designed for handling bulky loads of loose material such as sand, gravel, aggregate, sawdust, waste, etc.

The hopper can be tilted downward to scoop up loads, or it can be loaded from overhead. The truck is a standard 4000-lb. electric high-lift platform truck with a specially shortened platform to accommodate the hopper. The platform elevating mechanism is used to dump the hopper. *Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia 15, Pa.*

Titrimeter

A new improved titrimeter has recently been designed. This key electronic instrument for the quantitative determination of solutions features a completely new stand, improved stirrer and control box, and inte-



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Journeyman weaver Thomas Barrada tends a 230-inch loom, set up in 75 mesh; that means there are 17,250 warp wires between the mechanical "finger" in the foreground and the end of the loom. Back and forth across these wires flies a bobbin carrying shute, or filler, wire. Each time it traverses the width of the loom another shute wire is added to the woven wire cloth.

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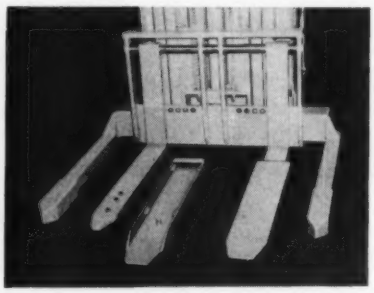
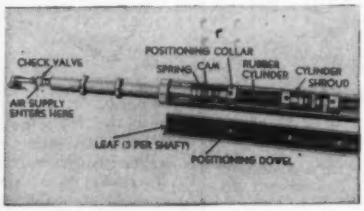
A special micro-titration accessory kit adapts the improved titrimeter for micro work. A complete Karl Fischer apparatus can be easily added to the titrimeter for moisture determinations. *Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.*



Fork extension

A new telescoping fork extension for use on the Raymond line of electric trucks has recently been designed. It remains on the elevating forks at all times, thus eliminating the possibility of misplacing the extensions and assuring their availability when required.

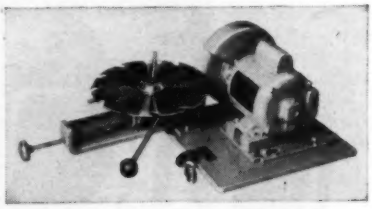
Formed steel channel sections with a retaining bar welded underneath fit over the regular elevating forks. A locking pin welded to the fork extension drops into any one of a series of holes drilled in the elevating fork making it possible to extend the fork to several desired lengths. The fork extensions are available on both the 2000-lb. and 3000-lb. capacity straddle-type electric trucks. *Raymond Corp., 8089 Madison St., Greene, N.Y.*



Collapsible shaft

Adaptable either for winding or unwinding paper without mandrels, chucks, collars, keys, wedges or other accessories commonly used for these operations, the new "Murco-Collard" pneumatic collapsible shaft expands to a true circle instantly by applying air through a valve on the tending side of the journal and collapses by a touch of the finger to the release valve without loss of time or damage to the paper.

It is easily placed in position and when expanded provides complete contact with core or paper throughout the entire length of the shaft, preventing slippage and damage to the paper or core. This collapsible shaft is simple in construction, yet ruggedly built with few parts subject to wear. *D. J. Murray Mfg. Co., Wausau, Wis.*



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Designed for wide tooth spaced saws (safety type), the "Easy Cut" circular saw sharpener generates the correct tooth shape with uniform, sharp, clean saw teeth. Some of its outstanding features are cam action, generation of the proper saw tooth lengths and shape, uniformity and accuracy; capacity for saws from 6 in. to 24 in. in diameter and

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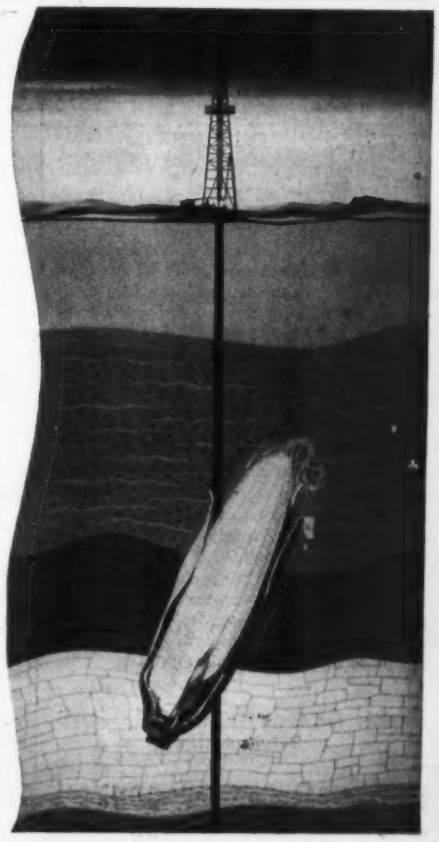


PUT *ACTION* IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.

SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

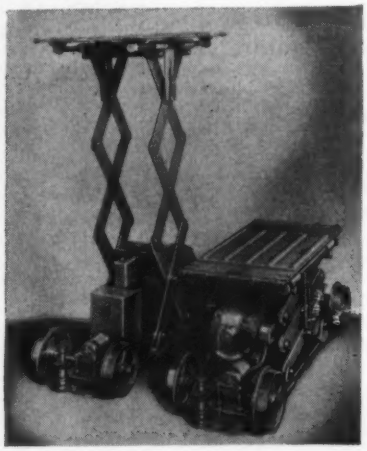
Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

special ½ H.P. capacitor motor. The feed finger is spring actuated and adjustment for saw hook is provided from 0 to 30 degs.

Saw bushings in sizes from ¼ in. to 2 in. are included, together with the Hanchett Red Anchor grinding wheel and wheel guard. This new machine also performs as a hand gummer. *Hanchett Mfg. Co., Big Rapids, Mich.*



Portable elevating table

Two special Portelvators, recently developed, operate on a track which skirts storage shelves and processing stations. They are moved manually from station to station and are elevated electrically.

The scissor-type lift mechanism is operated by a 1 hp elevator-type motor through standard Portelvator worm, worm gear and screw power transmission. The motor is actuated through foot control from either end of the table. Electrical controls include gear driven limit switch and reversing magnetic starter. *The Hamilton Tool Co., Hamilton, Ohio.*

Dial Indicator

A newly designed dial indicator which is suited for modern instrument panels and for individual mounting has recently been released.

This six-inch dial indicator has a high-visibility dial with white graduations and numerals on a black background. Its white wedge-shaped indicator is provided with a microadjustment to permit easy and accurate zero settings. A new stainless steel movement is designed to eliminate linkage errors.

The case of die-cast aluminum is so constructed that it may easily be face or flush mounted, bottom or back connected. The design of the instrument provides for almost universal actuation by any variable that makes use of a Bourdon spring as an energy-to-motion converter.

For temperature applications, four different types of actuation are available: mercury, vapor, gas or organic liquid (Monolex), with ranges from -100 to 1200 F. For pressure applications, range spans from 12 to 20,000 psi are available. Tension and compression load elements can also be incorporated in the new instrument for load applications with ranges from 0 to 75,000 lb. *Taylor Instrument Companies, 95 Ames St., Rochester 1, N.Y.*

New Products Briefs . . .

GRAVITY CONVEYOR—A new laned conveyor has the two center rows of wheels arranged to form an open channel for handling rolls of paper and other cylindrical products. This spacing does not interfere with handling wide sheets, cartons, and other materials on the same conveyor. Wheel arrangements to form several separate lanes may also be had. *The Rapids-Standard Co., Inc., Dept. SRW, 342 Rapistan Bldg., Grand Rapids 2, Mich.*

TRUCK CASTERS—An addition of an extra heavy 8-in. diameter size has been made to the Bassick Series "99" line of double ball race swivel steel truck casters. *The Bassick Co., Bridgeport 2, Conn.*

ALKALINE CLEANER—Magnus 61RS has a strong alkaline cleaning action, but has no fumes and is free from the hazards of caustics. On valves and fittings where a scale condition exists or an acid treatment is necessary to dissolve deposits, Magnus D-Scale-R is used. Valves and fittings with carbonized oil deposits are first treated with Magnus 751, a carbonized oil solvent. *Magnus Chemical Co., Inc., South Ave., Garwood, N.J.*

EMERGENCY LIGHT—A new Watchmaster automatic stand-by light with glass jar rechargeable battery and visible ball float hydrometer is now being offered. It supplies emergency light instantly when fuses blow or power failures occur. *The Carpenter Mfg. Co., Boston 45, Mass.*

FABRICATING UNIT—DexAngle, a 10-ft. long, 3 x 1.5 x .080-in. slotted-leg galvanized steel angle designed for all-purpose industrial fabrication is now available. A hacksaw and a wrench are the only tools needed for assembly. Equipment can be built, altered or dismantled in a few minutes. Drilling and welding are unnecessary. Auxiliary components such as panels and casters are also available. *Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.*

AIR DRIER—A new electric dehumidifier that can remove from the air up to three gallons of water every day is now available. It is large enough to dehumidify an enclosed space up to 10,000 cu. ft. *Westinghouse Electric Corp., Electric Appliance Div., East Springfield, Mass.*

RESIN—Plaskon Aminoplast 348-11L, a new resin which is reported to impart greater wet-strength to paper than any other product of its type, has shown significant improvements over both urea and melamine-formal-

dehyde types of wet-strength resins now in commercial use. *Libbey-Owens-Ford Glass Co., Plaskon Div., Toledo, Ohio.*

EXHAUST AND PRESSURE FAN—A heavy-duty direct drive fan for industrial applications, duct work, mine exhaust systems and filtering units where large volumes of air are needed under static pressure is now available. It is equipped with non-overloading, cast aluminum airfoil-type propellers. Motors are totally enclosed, ball bearing. *Chelsea Fan & Blower Co., Inc., 639 South Ave., Plainfield, N.J.*

PETROLEUM RESIN—A new thermoplastic resin known as S.P. Asphalt Resin is produced from petroleum by a solvent process and can be used for internal sizing of kraft paper, adhesives, waterproofing, etc. It is odorless and has a low volatility which makes it suitable for application at high temperatures. *The Atlantic Refining Co., 260 S. Broad St., Philadelphia 1, Pa.*

HUMIDITY AND TEMPERATURE INDICATOR—The new Model 186 Hygrodial is a somewhat larger instrument and has a larger and clearer dial than the former Model 185. It also has a wider base. The instrument is uniformly accurate over the entire relative humidity range, as compared with former and competing models where distortion was a bad factor at extremes of the scale. *Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica, N.Y.*

PAINT STRAINERS—The rust-resistant Rein strainer has an aluminum-coated steel wire stand that supports an aluminum funnel in which a copper-mesh strainer is held in place by a steel wire loop. The midget paint strainer fits on the suction tube on all popular commercial spray guns having a 7/16 in. diameter tube, straining the material as it leaves the gun. *Gardner Laboratory, Inc., 4723 Elm St., Bethesda, Md.*

DRIFT—Known as the Flex-Flo Safety Handrift, this new tool was designed specifically to overcome the hazards and high hidden costs of improvised hand drifts. It has the following features: Rivet-lok pinning which prevents the head from flying off the non-slip handle; a special analytically controlled alloy which can't chip, flake, or spark, and Flex-Flo construction which employs the principle of "Controlled Compression," providing mushroom-free service. *Custanite Corp., Box 66, Larchmont, N.Y.*

DIFFERENTIAL COLORIMETER—A complete set of color measurements can be made with the Colormaster differential colorimeter, an instrument for obtaining color measurements of synthetic fibers, paints, liquid solutions, pigments, slurries, etc. It has a system sensitivity appreciably greater than the eye can discern and is particularly useful for measuring differences between similar colors for process control applications. *Manufacturers Engineering & Equipment Corp., Hatboro, Pa.*

PENETRATING OIL—A new chemical known as "Kroil" creeps into the smallest spaces, dissolving rust and dried grease and supplying lubrication. It loosens frozen parts such as rusty nuts, bolts, shafts, bearings, bushings, and pipe threads. *Kano Laboratories, 1000 S. Thompson Lane, Nashville 11, Tenn.*

COPOLYMER SOLUTION—Polyco 408, a polyvinyl acetate copolymer solution, deposits films which are tough, glossy, scuff resistant, water resistant, grease resistant, heat sealable and possess non-blocking properties. It can be copolymerized in other soluents to meet certain requirements and specifications. *American Polymer Corp., Peabody, Mass.*

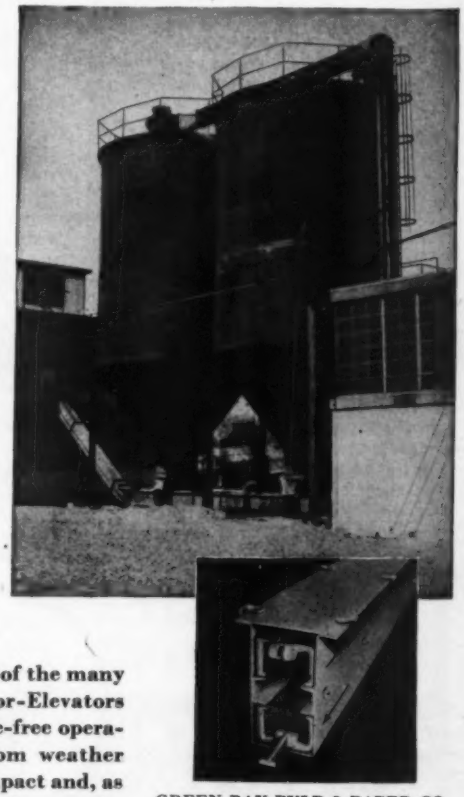
CEMENT FLOORING—A durable cement made of a combination of magnesium chloride and magnesium oxide with certain fillers and fine aggregates is known as Magna-Crete. It is supplied in dry form to be mixed on the job to a mortar consistency. Some of its advantages are light weight, good bonding qualities, resistance to oils and greases, silence, high structural strength, etc. *Flash-Stone Co. Inc., 3723 Pulaski Ave., Philadelphia 40, Pa.*

MASONRY PAINT—An oil base paint designed for decoration and protection against moisture infiltration, the new one-coat masonry paint, "Mason-Coat No. 310," is applicable to both interior and exterior surfaces of concrete block, cement, brick, stucco, asbestos cement siding and other similar masonry surfaces. *United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio.*

Redlers

PICK UP the CHIPS

Store and Carry Them to the Digesters



Chip handling is only one of the many jobs S-A Redler Conveyor-Elevators handle in a speedy trouble-free operation—fully protected from weather and spillage. They are compact and, as illustrated by this installation, can be fitted readily into existing plant layouts.

S-A engineers have developed a great variety of bulk materials handling equipment with which they can design unusually efficient systems. If you have an operation where handling costs are high or delays and trouble occur, see what S-A engineers can suggest. Write us.

GREEN BAY PULP & PAPER CO.
GREEN BAY, WIS.

From wood-room at right in picture, a horizontal run of one Redler Conveyor picks up wood chips and elevates them 52 feet, then bends to another horizontal run discharging into two storage bins. S-A Bin Discharge Unit, with revolving arch breaker to keep chips flowing freely, reclaims and feeds to the horizontal run of another Redler beneath bins. Same conveyor inclines upward 58 feet to top of building at left. Here it levels off and conveys horizontally over digestors to which it discharges. Low cost handling is achieved at 39 to 47 tons per hour.

1901-1951

50 years experience with bulk handling

STEPHEN S-A ADAMSON MFG. CO.

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DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

The Paper Industry New Literature

Books

INDUSTRIAL WASTE TREATMENT. By Edmund B. Besselievre. Published by McGraw-Hill Book Co., Inc., 327 W. 41st St., New York 36, N.Y. 365 pages. $7.00.

A guide for evaluating the various factors involved in arriving at a practical and economical solution to stream-pollution problems, this volume defines the waste problem, discusses the plant owner's responsibilities for solving it, and surveys, in detail, the jurisdiction of various agencies over the owner's actions. It describes available methods, equipment and devices for analyzing and solving industrial waste problems, and shows flow diagrams of treatment plants now in use, with accompanying photos of installations and units of equipment.

Among the topics discussed are the need for mutual cooperation between enforcing agencies, the industrialist, and the consulting specialists he has called in; the charges made by municipal systems for handling industrial wastes; the formation of districts to handle the wastes of several factories in one treatment plant, and the possibilities for re-using wastes and their recovery values. A summary of all federal and state laws concerning industrial waste treatment is given in the appendix.

CONTROLLERS FOR ELECTRIC MOTORS. Second Edition. By H. D. James and L. E. Markle. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N.Y. 418 pages. $7.00.

This second edition retains all the information about the design, application, operation, and maintenance of industrial controllers that was contained in the first edition. In addition, it includes chapters on such recent developments as the magnetic amplifier, the dynamo electric amplifier, magnetic clutches, a.c. and d.c. crane control, and remote and supervisory control.

The authors, Henry Duval James, consulting engineer, and Lewis Edwin Markle, design engineer, Westinghouse Electric Corp., have a combined background that totals 85 years' specialization in the field of motor control engineering.

AUSTRALIAN PULP & PAPER INDUSTRY TECHNICAL ASSOCIATION PROCEEDINGS, 1951. Vol. 5. Published by Australian Pulp & Paper Industry Technical Association, P.O. Box 18, South Melbourne, Victoria, Australia. 344 pages. 5½ x 8½.

Proceedings of the General Conference of APPITA, held March 17 to 22, 1951, are presented in this book. The opening chapter is devoted to an address given by the president of the association. Each of the following chapters deals with a different paper presented at the Conference, together with a discussion on the topic presented, and a summary of the paper. A list of officers and committees for 1951-52, a register of members, and a register and directory of company members are included.

COLOR IN BUSINESS, SCIENCE, AND INDUSTRY. By Deane B. Judd. Published by John Wiley & Sons, Inc., 440-4th Ave., New York 16, N.Y. 401 pages. 6 x 9¼. $6.50.

In this book, Dr. Judd, of the Photometry and Colorimetry Section, National Bureau of Standards, answers questions about color asked by thousands of men in commerce and industry during his more than 20 years with this government bureau. He explains the psychophysics of color in practical terms—in terms of the purchase, production, and sale of commodities whose color has an important bearing on their usefulness and price.

The book is divided into three parts: Basic Facts, Tools and Technics, and Physics and Psychophysics of Colorant Layers. The first part covers the eye, aspects of color (basic terms), color matching, and color deficiencies. The second deals with spectrophotometry, fundamental standards in colorimetry, visual colorimeters, reproduction of pictures in color, colorimetry by difference, color standards, uniform color scales, and color languages. Contained in the third part are sections on gloss, opacity or hiding power, Kubelka-Munk analysis, identification of colorants, and formulation of colorants.

Many tables, charts, and diagrams are included. A complete list of references is given.

Booklets and Pamphlets

PRACTICAL NICKEL PLATING. Published by International Nickel Co., Inc., 67 Wall St., New York 5, N.Y. 44 pages. 8½ x 11. Basic information on electroplating and detailed information on nickel plating and its practices are presented in this booklet. Keyed bibliography suggests 41 sources of additional reading. Information on the mechanical properties of deposits, plating conditions and commonly used solutions is given. Recommendations are made on preparation of basic metals, recognition and correction of plating difficulties and purification of solutions. Thickness and type of nickel deposit for adequate service life in many corrosion resistant, industrial and electroforming applications are discussed.

NEW PRODUCTS AND SERVICES. Published by *The Journal of Commerce*, 63 Park Row, New York 15, N.Y. 80 pages. 8¼ x 11. 50 cents. This new 1952 edition is the seventh in a series of recent surveys of all that is new in every major industry. It includes descriptions of the product or service, pictures, names of items, and names and addresses of manufacturers. There is also a section devoted to new product literature. A product index and manufacturer's index are given.

INDEX TO THE REPORTS OF THE NATIONAL CONFERENCE ON WEIGHTS AND MEASURES, FROM THE FIRST TO THE THIRTY-SIXTH, 1905 TO 1951. Publication M203 (supercedes M172). Published by National Bureau of Standards, U.S. Department of Commerce, Washington 25, D.C. 45 pages. 20 cents. (Order from Government Printing Office, Washington 25, D.C.). A carefully cross-indexed means is provided for the ready location of all material on any specific subject and of all material presented by any particular speaker.

SODA ASH—PROPERTIES, LOADING AND UNLOADING, HANDLING AND STORAGE. Third Edition. (Bulletin No. 5.) Published by Solvay Technical and Engineering Service, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y. 64 pages. 6 x 9. This third edition contains both new material and revisions, in addition to the charts and data that were included in the previous editions.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.

Flow Meters. Fischer & Porter Co., 6390 County Line Road, Hatboro, Pa.—Twelve-page catalogue 40 describes variable-area flow meters with newly developed tapered metal metering tubes. Besides containing complete data on the many types of Armored Flowrator meters, the catalogue devotes an entire section to meter extension combinations which are available to the armored meter user.

Motor Control Center. General Electric Co., Schenectady 5, N. Y.—This profusely illustrated 24-page bulletin, GEA-4979A, describes the new GE motor control center. A section on planning this motor control center is presented in four main steps. Specifications are given for motor control centers 600 volts and below. Many tables are included.

Conveyors-Elevators. Stephens-Adamson Mfg. Co., Aurora, Ill.—This 60-page catalogue, No. 140, describes Redler conveyor-elevators for conveying and elevating in a body any pulversized, granular, small lump or flaky material in any direction. A list of representative materials handled in this equipment is given. Numerous typical arrangements of Redlers are presented. The major part of the catalogue is devoted to a detailed description of the various models of conveyor-elevators and auxil-

MAGNUS-MADE

FABRICATED SCREEN PLATES

for High Plate Capacity – Long Plate Life

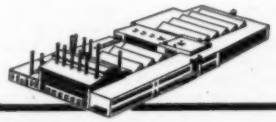
"Hardy" fabricated screen plates, made by Magnus of chrome-nickel-steel or inconel, have a high-strength, thin sheet design that's specially engineered for *maximum flow*. About 40,000 of these plates are now in service, with performance records that prove these three important advantages:

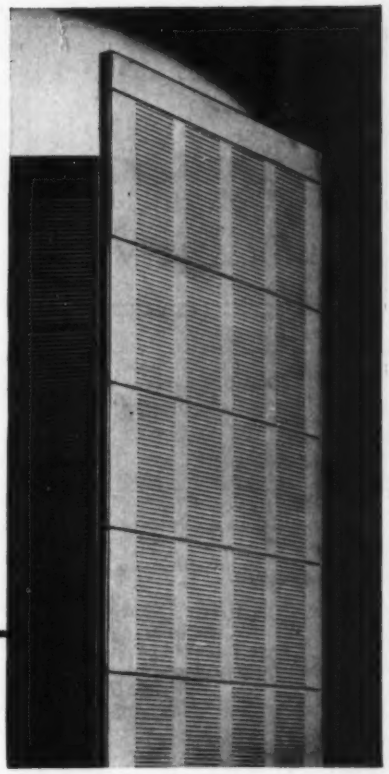
1. Increased Plate Capacity. The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

2. Longer Life. Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance, too.

3. High, Sustained Yield. Fabricated screen plates assure consistent, uniform quantities of cleaner pulp. This means improved production at reduced operating costs.

Complete information is yours on request. Or if you like, we'll gladly have an engineer call.





MAGNUS METAL CORPORATION, *Fitchburg, Massachusetts*

Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND INCONEL
VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"

SULPHITE MILL ACID PLANTS

Sulphur Burning Plants • Jenssen Two Tower Acid Systems • Gas Coolers—Surface and Spray Type • Jenssen Pressure Acid Systems • Jenssen Auxiliary Process Towers • Recovery Plants—Cooking Acid

SOLUBLE BASE ACID PLANTS
SEMI CHEMICAL PLANTS
JENSSEN SO_2 ABSORPTION SYSTEMS

FOR BLEACH PLANT APPLICATION
SULPHUROUS ACID PREPARATION

G. D. JENSSEN CO., INC.
WATERTOWN, NEW YORK
WESTERN REPRESENTATIVE:
JAMES BRINKLEY COMPANY, Seattle, Washington
FOUNDED 1915

The Trade-Mark of

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SKANEATELES FALLS, N. Y.

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Engineers Industrial Plants • Textile & Paper Mills • Location Studies • Appraisals • Reports • Surveys
J. E. SIRRINE COMPANY
GREENVILLE
SOUTH CAROLINA

iary equipment, together with photographs, dimension drawings and tables. One section is devoted to the application of this equipment in various types of plants.

Switchgears. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.—This 30-page illustrated booklet (B-5282) describes the "unitized" low-voltage switchgear. An explanation of this switchgear is given, and the applications for which it is best suited are outlined. Current ratings, interrupting ratings, and inspection, disconnection, and replacement data are included. Standard switchgear assemblies, universal frames and bus supports are described, in addition to other equipment. Information on how to order is supplied, and typical specifications are listed.

Fork Lift Trucks. The Buda Co., Harvey, Ill.—Three new 4-page bulletins illustrate and describe models of the new "FT Series" gasoline powered and diesel powered fork lift trucks. Bulletin No. 1579 describes models FT30-24 and FTD30-24 (3000 lb. capacity at a 24-in. load center). No. 1580 describes models F740-18 and FTD40-18 (4000 lb. capacity at an 18-in. load center). No. 1581 describes models FT40-24 and FTD40-24 (4000 lb. capacity at a 24-in. load center). Complete specifications, dimensions, and operating data are contained in these bulletins.

Overload Release. Dodge Mfg. Corp., Mishawaka, Ind.—Full information about the new Trimatic overload release from the Dodge line of Torque-Arm speed reducers is contained in this 4-page bulletin, A-616. All engineering data required for the overload release and list prices (subject to trade discounts) are shown in a concise manner by drawings and a table.

Conveyors & Elevators. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.—This 28-page booklet, No. 2475, contains information on Bulk-Flo conveyors and elevators. Included are photographs of the Bulk-Flo in a wide variety of applications, together with typical layout drawings, engineering data, calculation tables, charts and formulas. Over 150 materials are analyzed for average weight and such characteristics as size, flowability and abrasiveness.

Variable-Area Meters. Fischer & Porter Co., Hatboro, Pa.—Published to aid in the selection and sizing of variable-area meters, this new 40-page handbook contains, in condensed form, the results of 15 years' research by the Fischer & Porter Fluids Engineering Department. A complete description of variable-area meters, tubes and floats and their comparison with variable-head meters, as well as calibration prediction data, has been included.

Pumps. Lapp Insulator Co., Inc., Process Equipment Div., LeRoy, N.Y.—This 24-page bulletin, No. 300, describes the Lapp line of Pulsafeeder piston-diaphragm pumps. A list of chemicals handled by the Pulsafeeder is given. The bulletin goes into considerable detail on special liquid-handling assemblies. Both manual and automatically-controlled types are described.

Speed Reducers. De Laval Steam Turbine Co., Trenton 2, N.J.—This new 48-page bulletin describes the complete line of De Laval double worm and helical-worm gear speed reducers. Complete data is included on horsepower, output torque and center distances for reductions up to 6400:1. Detailed information on how to select double reduction gearing, examples of selection, horsepower rating tables, dimension sheets and complete physical data are presented.

Materials Handling. American Hoist & Derrick Co., St. Paul 1, Minn.—This 32-page general catalogue covers all American Hoist equipment from the giant revolver cranes, through their extensive line of locomotive cranes, hoists, material elevators, car pullers, down to the Crosby wire rope clips. There are many "on the job" pictures with minimum reading.

Steam Traps. W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.—This new 12-page bulletin, No. 152, features steam traps. Included are capacity tables, dimensions, recommended piping diagrams, typical applications, tables and data covering the selection of traps for various types of steam-using equipment.

Controls. General Electric Co., Schenectady 5, N.Y.—This new 8-page selection guide for a wide range of electric and electronic controls, devices, and accessories is designated as GEA-5781. The bulletin contains quick-reference selection data, photographs, and listings of additional publications, which give complete information on each of the equipment.

Construction & Equipment Costs. Denver Equipment Co., 1400 17th St., Denver 2, Colo. —A new bulletin, designated as No. F10-B16, has been added to the "Engineering Notebook" series dealing with construction and equipment costs and engineering data on typical mining and milling installations throughout the world. This bulletin covers the construction and operation of the Highland-Bell Mill in South Central British Columbia.

Thickness Gage. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Md.—This 4-page leaflet describes the Elcometer dry film thickness gage for thickness measurement of rubber, textiles, paper, etc. Included are numerous photographs, scale ranges and prices, and instructions for using this gage.

Stock Preparation. Sutherland Refiner Corp., Trenton 8, N. J.—This 18-page booklet describes the Sutherland continuous beater—its development, advantages, construction, method of operation, installation and service. Many photographs are included.

Continuous Gages. Pratt & Whitney, West Hartford 1, Conn.—This 8-page booklet describes the Model 10-A "Magnetic" continuous gage, temperature compensator, control meter, Model B "Magnetic" width gage, and the Micrograph.

Beating & Refining Machine. Morden Machines Co., Corbett Bldg., Portland 4, Ore.—The Morden "Stock-Maker" is the subject of this new booklet. In the center of the booklet is a unique "Transart" presentation, by means of which the internal construction of the "Stock-Maker" is very clearly and graphically shown. Each of the important parts shown in this 8-page presentation is numbered and these numbers correspondingly appear in the detailed description of the features of construction and operation of this machine. Also included are a list of uses, advantages, and specifications of the "Stock-Maker."

V-Belt Drives. Fort Worth Steel & Machinery Co., P. O. Box 1038, Fort Worth, Tex.—Engineering Guide No. 50-A contains simple formulas for standard quarter-turn and V-flat drives which are augmented by tables of drives in all belt sections which have been compiled for quick selections of drives of required ratio and speed. Engineering information on other types of V-belt drives is also included.

Instrumentation. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Bulletin 15-14, "Instruments Accelerate Research," has been augmented to include many items not covered in the previous edition and has been brought up to date to include the latest designs of various analytical equipment. The bulletin now comprises 96 pages and has complete illustrations, with pictures of the latest instruments and equipment in the laboratory, analytical and measurement fields.

Speed Changers. Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.—Technical Data Sheet No. 7 (revised February, 1952) describes the Series 7 anti-backlash miniature speed changers, for applications where the backlash between high and low speed shafts must be zero or a very low value.

Hardfacing. American Manganese Steel Div. of American Brake Shoe Co., Chicago Heights, Ill.—A new wall chart which details the proper hardfacing rod for the job is now available. The chart divides welding into basic operations, under which are listed the equipment parts to be Amscoated together with the recommended rod, available sizes, and preferred method of application. A fuller description of the uses of each rod also appears on the chart.

Copy Machines. Charles Bruning Co. Inc., Teterboro, N. J.—This 8-page booklet, A-2008, describes the Bruning Copyflex process. Photographs and a short description of a few of the Copyflex machines are included. A list of materials for every copying need is also given.

Neoprene Treated Paper. E. I. du Pont de Nemours & Co., Rubber Chemicals Div., Wilmington 98, Del.—Described in this 12-page technical bulletin are the properties that can be obtained in various kinds of paper by adding a few per cent of neoprene rubber latex to the paper pulp. A table of possible applications for neoprene treated paper is included. A detailed explanation of neoprene and its history is given, together with a diagram of the process through which neoprene latex is manufactured.

Seams for Dryer Felts. H. N. Hill & Co., Philadelphia 29, Pa.—Four-page Bulletin 1151, "Hilstrip Seams for dryer felts" gives instructions for installing these seams (stripglue).

Water Conditioning. Allis-Chalmers Mfg. Co., 991 S. 70th St., Milwaukee, Wis.—This new leaflet describes the alkalinity-reducing ion exchanger for use in boiler plants where raw water alkalinities are high and chlorides and sulphates are in a moderate range. A graphic comparison of water conditioning methods is included.

Plasticizers. Dow Chemical Co., Plastics Dept., Midland, Mich.—A new 22-page technical data bulletin, designed to assist manufacturers in making proper selection of plasticizers, gives the sales specifications, typical properties, compatibility or solubility of these materials and their uses.

Potentiometer. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—The new two-second high speed ElectroniK strip chart potentiometer is described and illustrated in Specification Sheet 179.

SALES REPRESENTATIVE

Prominent manufacturer of paper machine clothing has opening for sales representative.

We need a young man with initiative, moderate habits, good personality and appearance who must have considerable experience on paper machines.

Sales experience is desirable but not necessary.

Send detailed application with photo (which will not be returned) to Box 535, The Paper Industry.

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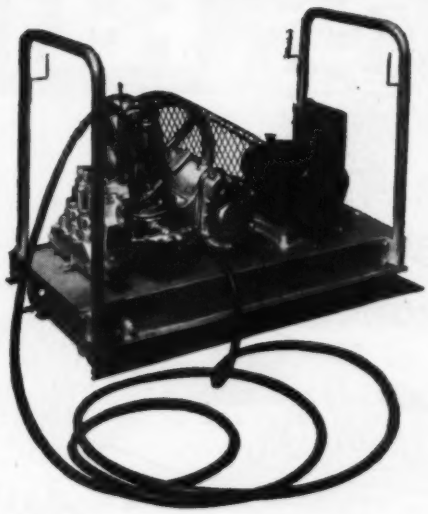

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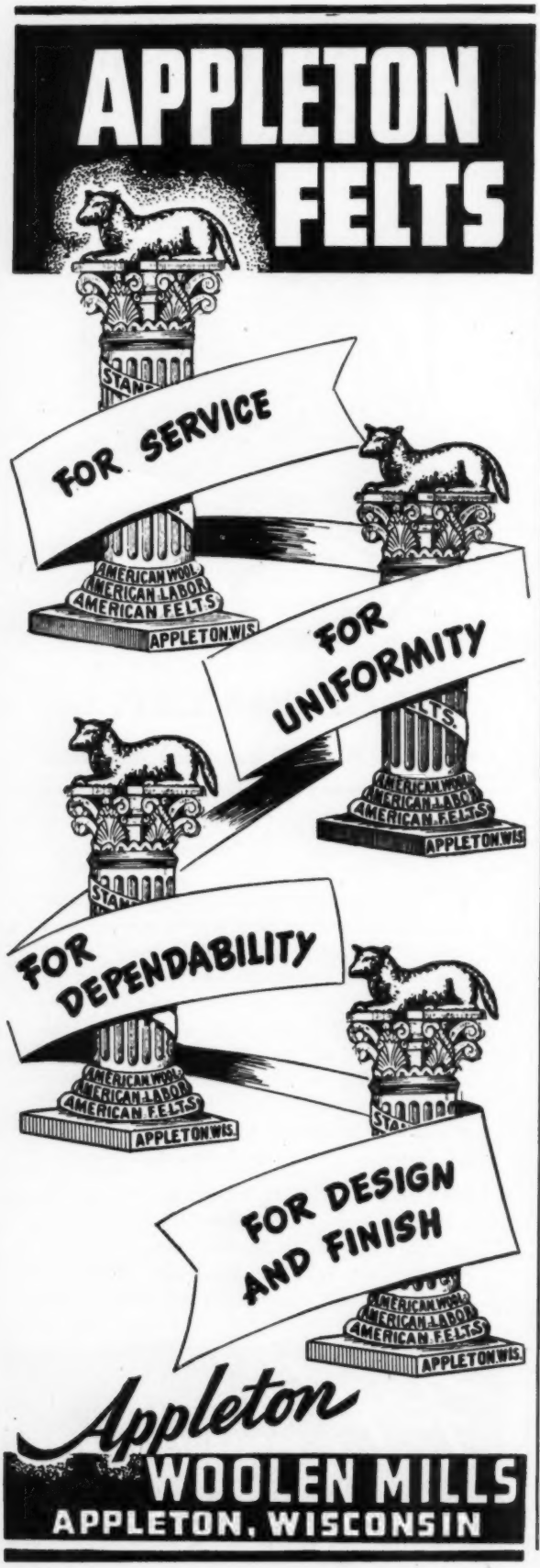

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are OPS ceiling prices, cents per pound, delivered mills:

	per cwt.
Blue Overalls	14.50
Corduroy	8.00
Washables, No. 1	6.50
Percales	12.50
Light Prints, No. 1	11.50
Khaki Cuttings—	
Sun Tan	11.50
Mixed	8.00
New White Canvas	19.00
Canton Flannels, bleached	21.00
Canton Flannels, unbleached	21.00
Shirt Cuttings—	
New White No. 1	21.00
Silesias No. 1	16.00
New Unbleached	21.00
Fancy	10.00
Linen Cuttings—	
American	14.50
White	21.00
Grey	21.00

Current quotations to mills, f.o.b. New York:

Blue Overalls	11.50 to 12.00
Washables, No. 1	4.75 to 5.00
Light prints, No. 1	8.25 to 8.50
Khaki Cuttings, Mixed	4.75 to 5.00
Canton Flannels, Bleached	14.50 to 15.00
Canton Flannels, Unbleached	14.50 to 15.00
White Shirt Cuttings, No. 1	15.00 to 15.50
Silesias, No. 1	10.50 to 11.00
New Unbleached Muslins	15.50 to 16.50
Fancy Shirt Cuttings	10.00 to 10.50
American Linen Cuttings	12.00 to 12.50

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

Roofing—	per cwt.
No. 1	1.25 to 1.30
No. 2	.95 to 1.05
No. 3 and 4	.80 to .90
Twos and Blues—	
Repacked	3.00 to 3.25
Thirds and Blues—	
Repacked	2.50 to 2.75
Miscellaneous	2.00 to 2.25
Whites, No. 1—	
Repacked	6.00 to 6.25
Miscellaneous	5.00 to 5.25
White, No. 2—	
Repacked	4.75 to 5.00
Miscellaneous	4.00 to 4.25

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.25 to 5.50
Domestic	5.50 to 5.75
Wool Tares—	
Light	6.50 to 6.75
Heavy	6.75 to 7.00
No. 1 Scrap Bagging	4.75 to 5.00
Manila Rope—	
No. 1 large	8.00 to 8.25
No. 1 small	7.00 to 7.25
Sisal Rope—	
No. 1 large	6.50 to 7.00
No. 1 small	6.00 to 6.25
New Burlap Cuttings	6.50 to 7.00
Jute Threads—	
Foreign (Nom.)	7.50 to 8.00
Domestic	7.50 to 8.00
Strings—	
No. 1 sisal	6.00 to 6.50
No. 2 sisal	5.50 to 5.75
Soft jute	5.75 to 6.00
Mixed	3.50 to 3.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts	120.00 to 125.00
Hard White, No. 1	70.00 to 75.00
Soft White, one-cut	65.00 to 70.00
Soft White, No. 1	55.00 to 60.00
Soft White, Misc.	35.00 to 40.00
Fly Leaf, No. 1	22.50 to 25.00
Fly Leaf, Woody No. 1	20.00 to 22.50
No. 2 Mixed Col. Woody	15.00 to 17.50
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	20.00 to 22.00
Mixed Books	14.00 to 15.00
Ledger Stock—	
No. 1 White	45.00 to 50.00
No. 1 Mixed (Colored)	30.00 to 35.00
Manilas—	
New Env. Cuttings	55.00 to 60.00
New Env. Cuts, One-Cut	—
Extra Manilas	22.50 to 25.00
Manila Tab Cards, Free of	
Ground Wood	65.00 to 70.00
Colored Tab Cards	45.00 to 50.00
Kraft—	
New Envelope Cuttings	55.00 to 60.00
Tripled Sorted No. 1	
100%	40.00 to 42.50
No. 1 Old Assorted	27.50 to 30.00
News—	
White Blank	60.00 to 65.00
Overissue	17.00—
No. 1 Folded	8.00—
Old Corrugated Containers	10.00 to 12.00
New Jute Corrugated Cuts	16.00—
Mill Wrappers	8.00—
Box Board Chips	6.00—
No. 1 Mixed Paper	5.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	4.30—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	90.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	28.00—
Argentine, lb.	17.50—
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	15.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00

MARKET QUOTATIONS

Chlorine—	
Tanks cars (wks) cwt.	2.70—
Gelatine (silicin), lb.	**1.25 to 1.35**
Glyc. (C.P.) drums, lb.	34.00 to 34.50
Litharge, powd. bbl. lb.	.17¾ to .18¾
Rosin (Gum)—	**New York, per 100 lbs.**
E	8.25—
F	8.25—
G	8.25—
WW	8.45—
Rosin (Wood), carlots, F.O.B. South	4.25 to 4.50
Salt Cake—	
Dom. bulk (wks) ton	17.00 to 23.00
Imp. bulks on dock—	
(Atl. ports) ton (Nom.)	**25.00—**
Soda Ash—	
Bulk (works) cwt.	1.20—
Paper bags, cwt.	1.50—
Soda (Caustic)—	
Solid drums, cwt.	3.35 to 3.40
Ground and flake, drums, cwt.	3.75 to 3.85
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.70 to 1.80
40 deg. 35 gal. drums, (works), cwt.	1.40 to 1.50
Starch—	
Pearl, 140 lb. bags, cwt.	6.44—
Pearl, barrels, cwt.	6.44—
Paper (Sp.) bags, cwt.	6.44—
Powdered, barrels, cwt.	6.65—
Sulphur (Crude)	
(Mine) bulk, long ton	21.00 to 22.00
Talc—	
Dom. 100 lb. bags (mine) ton	25.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig. bbls., lb.	.21 to .21½
Calcium Pig. bbls., lb.	.21 to .21½
Zinc Sulphide, bbls., lb.	11.50 to 11.75

WOOD PULP

The following are OPS ceiling prices on domestic wood pulp, dollars per short air dry ton delivered consuming mills including the basic maximum freight allowances as provided:

Bleached sulphite	140.00—
Unbleached sulphite	132.50—
Bleached sulphate	145.00—
Semi-bleached sulphate	140.00—
Unbleached sulphate	132.50—
Bleached soda	140.00—
Ground wood	92.50—
Sulphite screenings	72.50—
Sulphate screenings	67.50—
Ground wood screenings	60.00—
Unbleached sulphate siderurns	132.50—
Standard news print siderun	92.50—

OPS ceiling prices on European wood pulp, dollars per short air dry ton, on dock at American Atlantic ports, follow:

Bleached sulphite	225.00—
Bleached sulphate	230.00—
Unbleached sulphite	200.00—
Unbleached sulphate	200.00—

Current quotations on imported wood pulp, dollars per short air dry ton, on dock American Atlantic ports follow:

Bleach. sulphite, Canadian	150.00—
Bleach. sulphite, Swedish	140.00—
Bleach. sulphite, Norwegian	140.00—
Bleach. sulphite, Finnish	140.00—
Unbl. sulphite, Canadian	140.00—
Unbl. sulphite, Swedish	125.00—
Unbl. sulphite, Finnish	105.00—
Blch. kraft, Canadian	150.00—
Blch. kraft, Swedish	145.00—
Unbl. kraft, Canadian	100.00—
Unbl. kraft, Swedish	115.00—
Unbl. kraft, Finnish	105.00—

PAPER

Boards—

OPS ceiling prices (CPR 108) per ton, delivered consumer's mill, 10 tons or more:

Plain chip	90.00—
News vat lined chip	92.50—
Filled news	100.00—
Solid news	102.50—
White vat lined chip	132.50—
Chip tube and can stock	100.00—
Single manila lined chip	137.50—
Single jute lined chip	135.00—
White patent coated:	
.020	160.00—
.018	162.50—
.016	165.00—

Book Paper—

OPS ceiling prices (CPR 106) per cwt.:

Coated two sides		
70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides	4 cases	$17.25
	Carloads	$16.30
45 lb. enamel, 25x38-500, trimmed 4 sides	4 cases	$13.05
	Carloads	$12.10
Uncoated		
55 lb. No. 2 offset, 25x38-500, trimmed 4 sides	4 cases	$14.80
	Carloads	$13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed	4 cases	$14.05
	Carloads	$13.10
20 lb. envelope, 17x22-500, untrimmed	Carloads	$12.4[illegible]
16 lb. tablet, 17x22-500	Carloads	$11.3[illegible]

Rag Content Bond—

OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

	17 lbs. or heavier	16 lbs.
Extra 100% rag	57.50	58.50
100% rag	49.50	50.50
75% rag	38.00	39.00
50% rag	29.50	30.50
25% rag	24.00	25.00

Rag Content Ledger—

OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

Extra 100% rag	58.50
100% rag	50.50
85% rag	42.00
75% rag	39.50
50% rag	30.50
25% rag	25.00

Sulphite Bond—

OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

	17 lbs. or heavier	16 lbs.
Air dry bond (Watermarked)	20.00	21.00
No. 1 bond (M.F. watermarked)	15.50	16.20
No. 2 bond (M.F. watermarked)	14.90	15.60
Plain bond (M.F. unwatermarked)	14.00	14.60

Sulphite Ledger—

OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

No. 1, M.F. watermarked	16.50
No. 2, M.F. watermarked	15.90
Plain, M.F. unwatermarked	15.00

Glassine (f.o.b. mill)—

OPS base ceilings (CPR 76):	per cwt.
25 lb. base No. 1 bleached glassine	22.50—
25 lb. base No. 1 bleached greaseproof	20.00—

News—

	per ton
Rolls, Standard (Contract)	116.00 to 126.00
Rolls (Spot)	(Nominal)
Sheets	130.00—

Tissues (Carlots)—

	per ream
White No. 1	1.90—
White No. 2	1.60—
Bleached Anti-Tarnish	—
Colored	2.00—
Anti-Tarnish Kraft	1.90—
Manila	2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	10.00—
Toilet, Unbleached (M shts.) per cs.	8.00—

Towels

	per case
Bleached	6.80—
Unbleached	5.90—

Wrappings (Kraft)—

OPS ceilings, per cwt., 50 lb. base weight:

	per cwt.
Standard wrapping	7.75—
Butchers, counter rolls	8.25—
Standard bag, mill rolls	7.50—
Shipping sack, mill rolls	7.75—
Gumming, mill rolls	8.00—
Asphalting, mill rolls	7.75—
Envelope, mill rolls	9.25—

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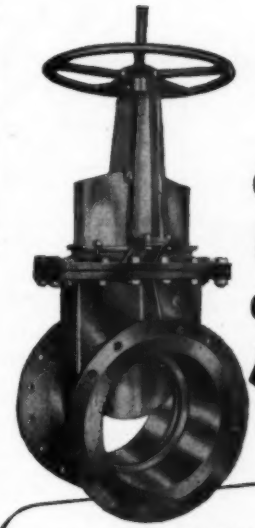

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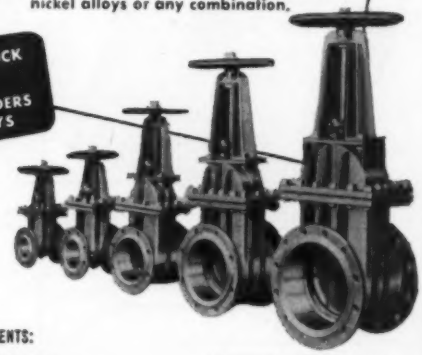

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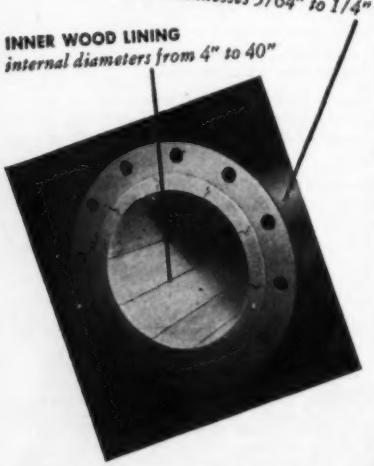

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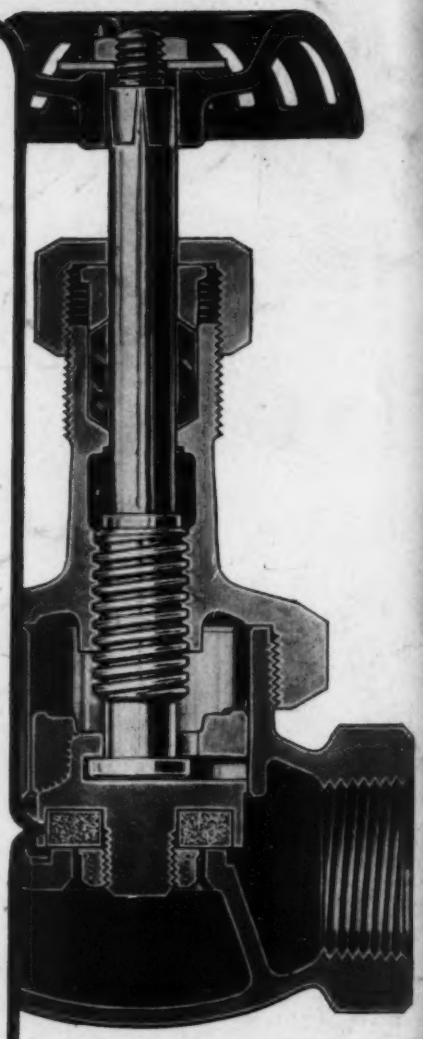

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